United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Massachusetts
Agricultural Experiment
Station

Soil Survey of Hampden and Hampshire Counties, Western Part, Massachusetts

How To Use This Soil Survey

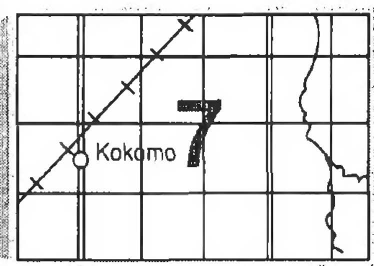
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

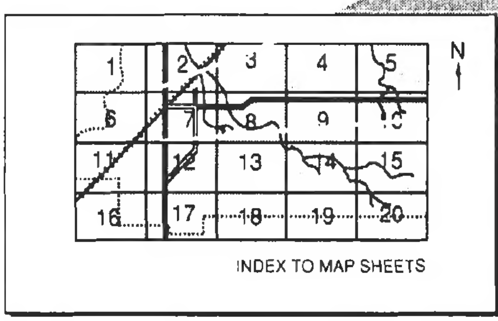
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



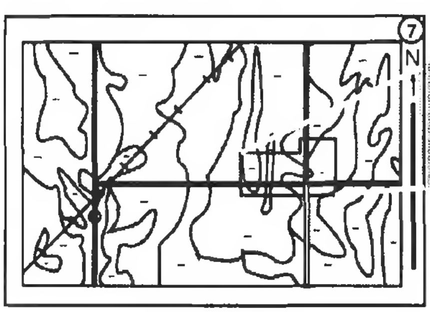
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



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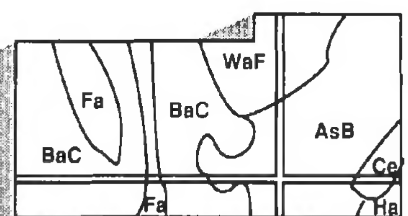

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1988. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service and the Massachusetts Agricultural Experiment Station. Part of the funding for the survey was provided by the Massachusetts Office of Environmental Affairs, Division of Conservation Services, and by the Hampden and Hampshire Conservation Districts. The survey is part of the technical assistance furnished to the Hampden and Hampshire Conservation Districts.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: An area of Shelburne loam, 3 to 8 percent slopes; Ashfield fine sandy loam, 3 to 8 percent slopes; and Pillsbury-Peacham-Wonsqueak association, undulating, extremely stony. The pond is in a drainageway in an area of the Pillsbury-Peacham-Wonsqueak association.

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Foreword

This soil survey contains information that can be used in land-planning programs in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Cecil B. Currin
State Conservationist
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Soil Survey of
Hampden and Hampshire Counties, Western Part, Massachusetts

By Richard J. Scanu, Natural Resources Conservation Service

Fieldwork by Richard J. Scanu, Natural Resources Conservation Service, and
Michael F. Gragnolati, Hampden and Hampshire Conservation Districts

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
Massachusetts Agricultural Experiment Station

This survey area is in the western part of Massachusetts (fig. 1). It is roughly rectangular. It has an area of about 256,735 acres, or 401.1 square miles. It includes 14 towns. It is bounded on the west by Berkshire County, Massachusetts; on the north by Franklin County, Massachusetts; on the south by Litchfield and Hartford Counties, Connecticut; and on the east by the Connecticut Valley Lowland.

Most of the survey area is forested. Farmland is in scattered areas throughout the survey area. The extent of residential development is increasing rapidly throughout the survey area. In 1980, the population of the area was about 12,000.

This soil survey updates the survey of Hampden and Hampshire Counties published in 1932 *(5)*. It provides additional interpretive information and has larger maps, which show the soils in greater detail.

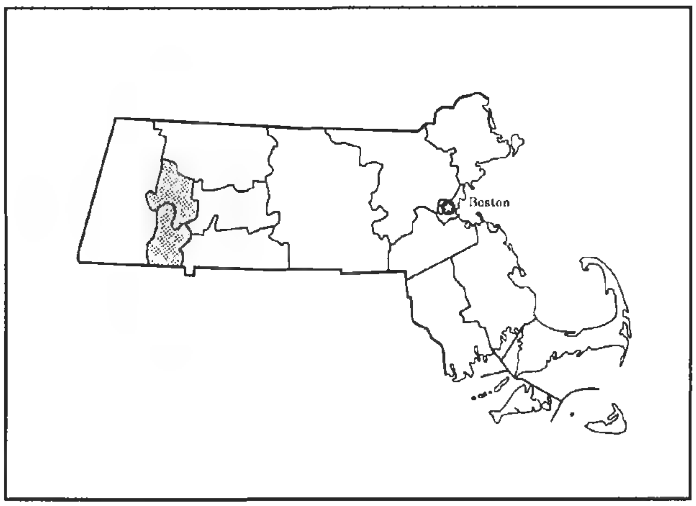

Figure 1.—Location of Hampden and Hampshire Counties in Massachusetts.

General Nature of the Survey Area

This section provides general information about the survey area. It describes history and development; climate; physiography, relief, and drainage; and geology.

History and Development

The western part of Hampden and Hampshire Counties is a region of mountains, deeply cut valleys, and a central plateau. The plateau has an elevation of about 1,500 feet. This region includes 14 "hilltowns," the history of which follows a pattern familiar to many New Englanders *(3, 6)*.

Some of the original land tracts, such as Goshen, were bought or rented from England. Other town areas, including Huntington and Plainfield, were sold at auction in Boston as plantations in 1762. Families of settlers came from areas that had become too crowded to offer economic opportunities. They were attracted by the great forests and convenient water power in the rushing mountain streams.

As settlements grew, the rights of the settlers came to be recognized and towns were incorporated. Town governments were formed, sharing powers with the

church, which was the earliest organization in each settlement. Education was conducted in homes until school buildings were voted in at town meetings. By the early 1800's, most of the towns had churches, town halls, and schools.

By 1790, most of the land having agricultural value had been cleared and was farmed. Stones were removed from the fields and were used when the settlers fenced the farms with stone walls. The settlers were self-reliant and farmed for subsistence. At first, corn and rye were the most important staple crops. As roads were improved and markets became available, cheese, cider, and vinegar were produced. Other plentiful products were potatoes, fruit, honey, and maple sugar.

Early commerce began as inns and traders became established in the survey area. Sawmills, which were established in the wake of the first settlers, handled the wood cleared from the forests. They supplied lumber for the original buildings in the area. In the early 1800's, tradesmen, such as tanners, blacksmiths, and toolmakers, prospered and provided skilled labor. Mill factories produced numerous useful items, such as broom handles and sleds, needed by the inhabitants.

In the mid-1800's, the arrival of the railroad marked the beginning of substantial industrial growth. The population in the survey area clustered in villages near the railroad stations. The first train from Springfield to Chester ran in May 1841. As many as 60 trains passed through Huntington daily.

Agriculture and industry went hand in hand. Local farmers who raised flocks of merino sheep supplied wool to the busy textile mills. When a depression hit in 1900, other areas suffered greatly from unemployment. In the hilltowns, however, people still worked hard and ate well. When some of the local mills shut down, the townspeople of Huntington made efforts to ensure that they were reopened.

The population of the survey area reached a peak in the mid-1800's. During the latter part of the 19th century, it dwindled rapidly to less than half of the peak population.

In the early 1900's, a growing consumer demand in nearby urban regions opened markets to dairy farms, which increased in number in the survey area, only to diminish later. Meanwhile, potatoes became an important crop. Textile mills in the hilltowns produced army cloth during the First World War. These mills failed in the 1950's.

In recent times, many farms have been falling into disuse and property ownership has been changing. Much of the property in the survey area is owned by commuters who work in other areas but prefer the atmosphere of a small community.

Climate

In the western part of Hampden and Hampshire Counties, winters are cold and summers are moderately warm and have occasional hot spells. The annual precipitation is well distributed throughout the year and is nearly always adequate for all of the crops commonly grown in the survey area. Snow frequently falls in winter, occasionally during blizzards.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Cummington Hill, Massachusetts, for the period 1963 to 1986. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 22 degrees F and the average daily minimum temperature is 14 degrees. The lowest temperature on record, which occurred at Cummington Hill on December 25, 1980, is -20 degrees. In summer, the average temperature is 65 degrees and the average daily maximum temperature is 75 degrees. The highest recorded temperature, which occurred on August 3, 1975, is 93 degrees.

Growing degree days are shown in table 1. They are equivalent to heat units. During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is more than 46 inches. Of this, nearly 25 inches, or about 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall during the period of record was 6.08 inches at Cummington Hill on July 30, 1986. Thunderstorms occur on about 22 days each year.

The average seasonal snowfall is about 79 inches. The greatest snow depth at any one time during the period of record was 40 inches. On the average, 118 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 75 percent. The sun shines 65 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in spring.

Extreme meteorological events have been

documented in the survey area. A tornado hit Goshen in 1788. Unusually strong thunderstorms occurred in 1869, 1859, and 1815. The storm in 1869 was probably a hurricane. It destroyed many roads, which had to be relocated. In 1888, the snowfall from a blizzard blocked roads for a week and buried houses and barns to the eaves. In 1938, the worst recorded hurricane in the area destroyed roads and trees and nearly all of the bridges in the area.

Physiography, Relief, and Drainage

This survey area consists of a severely dissected, somewhat uneven plateau that slopes southeastward. The smoother parts of this plateau are in the northwestern and southwestern parts of the survey area, in the towns of Plainfield, Goshen, Cummington, Worthington, Chesterfield, Tolland, and Blandford. These areas include smooth ridgetops and gently rolling hills. A few hills rise several hundred feet above the plateau. Stronger relief occurs along the Westfield River and its tributaries.

Elevations in the survey area range from about 2,160 feet above sea level at Bryant Mountain, in Cummington, to about 180 feet in an area where the Westfield River leaves Russell.

Most of the survey area is drained by the Westfield River. The eastern part of Westhampton, however, is drained by the North Branch River, and the southwest corner of the survey area is drained by the Farmington River.

Geology

Rick Pershken, geologist, Natural Resources Conservation Service, helped prepare this section.

The development and characteristics of the soils in a region are profoundly affected by the types of bedrock and geologic history of the region. The western part of Hampden and Hampshire Counties is underlain by metamorphic rocks, mainly schist and gneiss. The bedrock in the area crops out in north-south trending zones that extend from Connecticut, through Massachusetts, and into Vermont. This area represents a transition between the subdued topography of the Connecticut River Valley and the steeper slopes, stronger relief, and higher elevations of the Berkshire Highlands.

The different types of bedrock have been grouped, named, and mapped by the United States Geological Survey in cooperation with the Commonwealth of Massachusetts Department of Public Works. The geology map at the back of this publication was compiled from this information. The map and corresponding legend show the name and location of the rock formations and their major components.

Two mountain-building events, the Taconic, 440 to 500 million years ago, and the Acadian, 400 to 350 million years ago, caused folding, faulting, and uplifting of the rocks. The mountains produced by these events were weathered and eroded for millions of years, resulting in a topography of low, undulating hills.

As in all New England, the geologic history of the survey area includes advances of continental glaciers. Thick ice sheets covered the area and directly shaped the topography. The most recent glacial advance, the Wisconsin glacial stage, reached its peak about 18,000 years ago and ended about 10,000 years ago.

The glaciers scoured the landscape, deepening and widening the valleys. They eroded the bedrock and previous glacial deposits and accumulated material in the process. Deposits from retreating glaciers covered the land. Many of the soils in the survey area formed in these deposits.

The glacial till in the highlands varies in thickness. In some areas bedrock is exposed, and in others the till is as much as 150 feet thick. The soils most commonly associated with the thinner deposits of till are those of Chatfield, Hollis, Lyman, Tunbridge, Millsite, and Westminster series. The soils most commonly associated with the thicker deposits of till are those of the Ashfield, Paxton, Peru, Marlow, Montauk, Scituate, Shelburne, and Woodbridge series.

Lakes and ponds formed in depressions left by stagnant glacial ice. Successions of vegetation have since filled some of these, causing the formation of swamps, bogs, and marshes. Lupton, Wonsqueak, and Palms soils are typically in these areas.

Stratified, well sorted glacial outwash deposits are typically at the lower elevations. The soils most commonly associated with these deposits are those of the Hinckley, Merrimac, and Windsor series.

As the glaciers retreated farther to the north, river systems began to develop on the new land surface. As postglacial drainage patterns developed, alluvium was deposited along the rivers and streams. Most alluvium consists of fine sand, organic material, and silt, but in some areas it includes fine gravel. Rippowam and Pootatuck soils formed in these alluvial deposits.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of

crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar)

inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

Survey Procedures

The general procedures followed in making this survey are described in the National Soils Handbook of the Natural Resources Conservation Service. Also, several United States Geological Survey surficial geologic maps were used to help soil scientists in the analysis of land formation.

Before field mapping began, preliminary boundaries of the major landforms were plotted stereoscopically on field atlas sheets after analysis of the geology, previous soil maps (where available), and photo and topographic interpretation. Atlas sheets consisted of quad-centered aerial photographs made in 1977 at a scale of 1:80,000 and enlarged to a scale of 1:24,000.

Soil scientists took the prepared atlas sheets into the field and traversed the landscape on foot. They ran traverses across the major landforms, and they observed road cuts, backhoe pits, and other deep excavations in which the soil horizons were exposed. Also, they dug holes, generally to a depth of 4 to 6 feet, using a tile spade (a long, narrow-bladed shovel) or soil auger (a drill-like sampling device).

Depending on the complexity of the soil pattern, the distances between the traverses ranged from 100 to 300 yards and the distances between the holes ranged from 50 to 600 feet. In the highly urbanized areas, the land was traversed in a similar fashion, but the existing roads were followed in a pickup truck and the traverses were made at more widely spaced intervals. The soils in these areas were observed in open excavations, in road cuts, and in holes dug by the soil scientists. In addition to these field observations, the soil scientists used geologic studies and historical documentation of land alterations.

The soils in the survey area were examined for profile development, texture, pH, characteristics of the underlying material, the degree of wetness, and other related soil features.

In many areas additional transects were made in representative areas of complex map units to obtain more detailed information about map unit composition and about the kinds and extent of inclusions. In most areas the point intersect method of transecting was used. The soils were examined at intervals of 100 to 150 feet, and data about the soils were recorded. Several randomly selected areas of a particular kind of map unit were transected, and the data about the soils were then compiled and summarized for the survey area.

While the soil survey was in progress, samples for chemical and physical analyses were made of typical pedons of major soils. The analyses were made by the University of Massachusetts Soil Laboratory, in Amherst, and the Massachusetts Department of Public Works, in Wellsley. The results of these analyses, along with field observations, research data, production records, and the field experience of specialists, were used in making interpretations and predictions of soil behavior.

After completion of soil mapping on field atlas sheets, map unit delineations were transferred by hand to orthophotographs (a more versatile base than aerial photography) at a scale of 1:25,000. Most drainage and cultural features were transferred from United States Geological Survey 7½-minute topographic maps or were recorded after visual observations.

Mapping Intensities

The western part of Hampden and Hampshire Counties was mapped at two different levels of intensity. The level of intensity used was determined by the intricacy of the soil pattern in relation to the expected intensity of land use. Areas that were open or cleared were mapped at medium intensity, and areas of woodland or brush were mapped at low intensity. The 1,000-foot elevation contour was used as a dividing line between the warmer (mesic) soils and the colder (frigid) soils.

In areas that were mapped at medium intensity, the

soils were examined at moderate intervals and the map units were narrowly defined in terms of predictions for intensive uses, such as building site development, sanitary facilities, and cropping. The smallest areas shown are 3 to 5 acres in size. Areas that are less than 3 to 5 acres in size but that significantly affect use and management are represented on the maps by special symbols or are identified in the map unit descriptions.

In areas that were mapped at low intensity, the soils were examined at wide intervals and the map units were broadly defined in terms of predictions for broad land uses, such as timber management and recreational development. Significant areas of included soils are in most map units and may be as much as 30 acres in size. The included soils that significantly affect use and management are identified in the map unit descriptions.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that effect management.

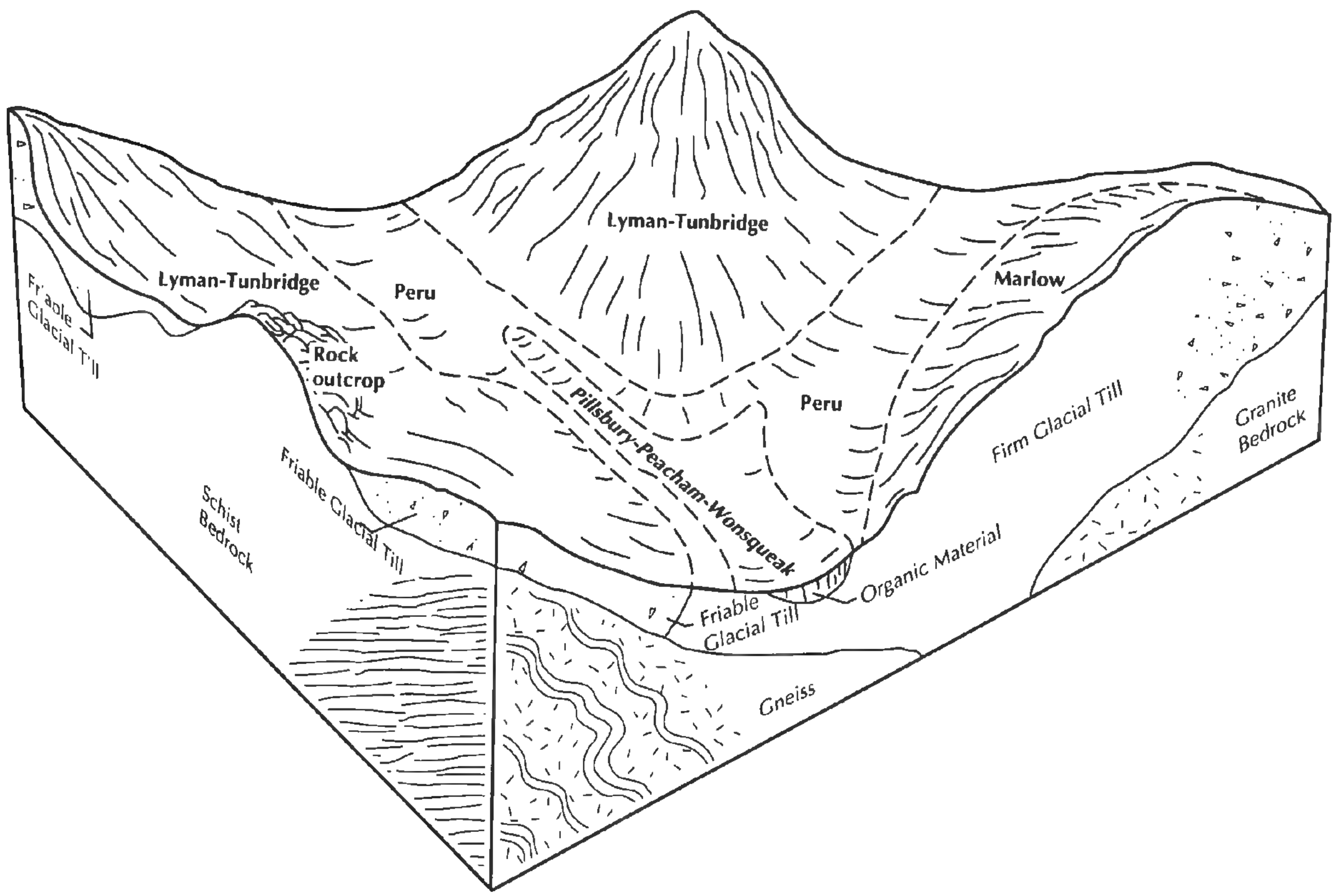

Figure 2.—Pattern of soils and parent material in the Lyman-Tunbridge-Peru general soil map unit.

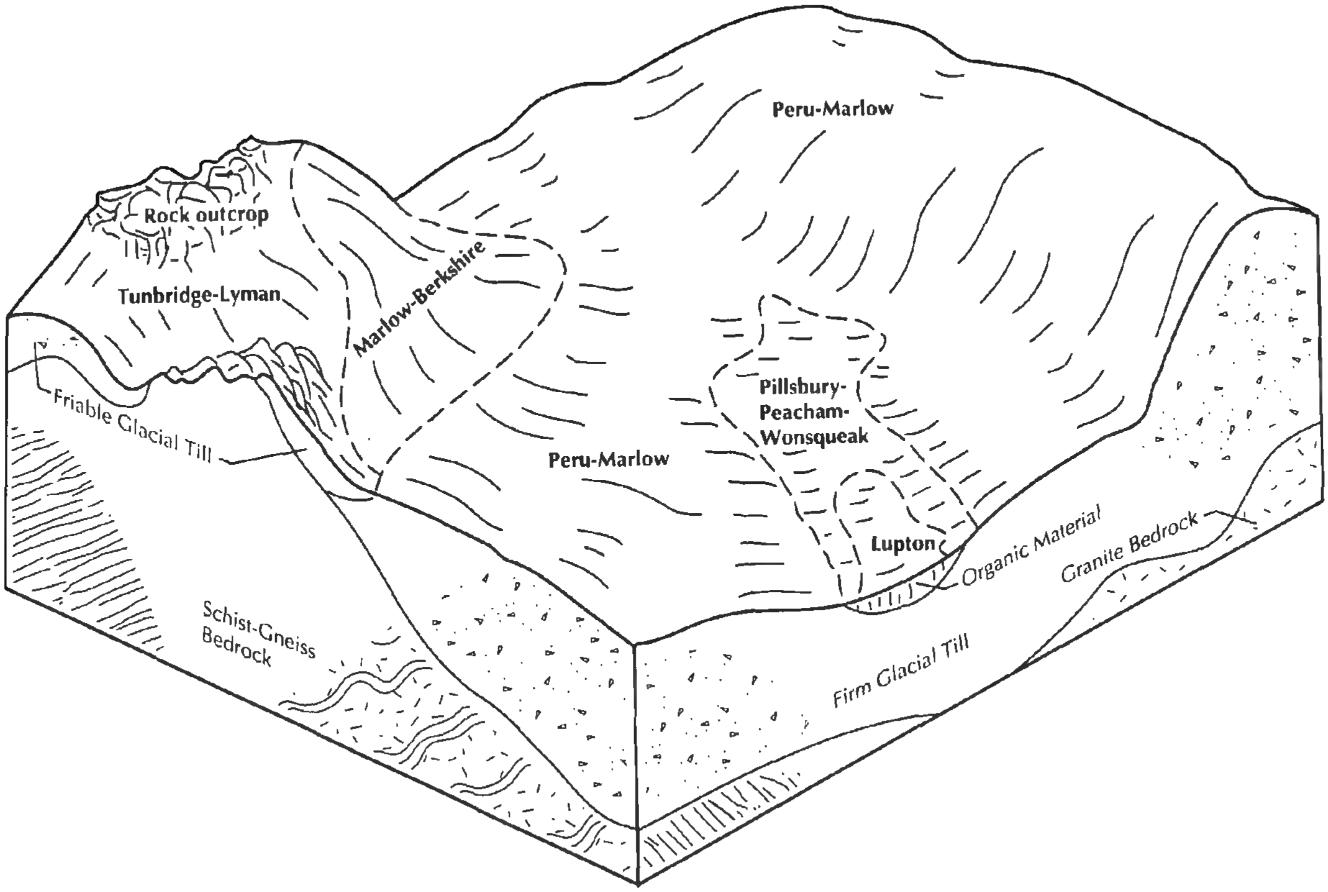

Figure 3.—Pattern of soils and parent material in the Peru-Marlow general soil map unit.

Soil Descriptions

1. Lyman-Tunbridge-Peru

Shallow, moderately deep, and very deep, somewhat excessively drained, well drained, and moderately well drained, gently sloping to very steep, frigid, loamy soils formed in firm glacial till derived from schist, gneiss, and granite; on uplands

This map unit consists of gently sloping to very steep soils on hilltops and hillsides, mainly in the western half of the survey area. Rock outcrops are prominent landscape features. Many stones and boulders are on the surface.

This is the most extensive general map unit in the survey area. It makes up about 25 percent of the area. It is about 45 percent Lyman soils, 35 percent Tunbridge soils, 10 percent Peru soils, and 10 percent soils of minor extent (fig. 2).

The Lyman soils are shallow, somewhat excessively drained, and medium textured. They formed in thin deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and are underlain by bedrock at a depth of about 16 inches. These soils are typically on the upper steep slopes.

The Tunbridge soils are moderately deep, well drained, and medium textured. They formed in moderately deep deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and are underlain by bedrock at a depth of about 26 inches. These soils are typically in the less sloping areas or pockets between the Lyman soils and bedrock outcrops.

The Peru soils are very deep, moderately well drained, and medium textured. They formed in deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and a firm substratum that restricts water movement and root growth. These soils are typically in concave areas and on the lower parts of slopes.

The soils of minor extent in this map unit include Pillsbury, Marlow, and Berkshire soils. Also of minor extent are areas of organic soils and Rock outcrop. The

well drained, very deep Marlow soils are intermingled with areas of the well drained, very deep Berkshire soils. The poorly drained Pillsbury soils and the very poorly drained organic soils are in low areas or depressions. The Rock outcrop is in scattered areas on hillsides and ridges.

Most of the acreage in this map unit is forested. Because of the stones on the surface and the areas of exposed bedrock, the major soils are poorly suited to cultivated crops, hay, and pasture. The slope, the shallowness to bedrock, and the stoniness are the main limitations affecting building site development and sanitary facilities.

2. Peru-Marlow

Very deep, moderately well drained and well drained, gently sloping to very steep, frigid, loamy soils formed in firm glacial till derived from schist, gneiss, and granite; on uplands

This map unit consists of gently sloping to very steep soils on hilltops and hillsides, mainly in the western part of the survey area. Many stones and boulders are on the surface.

This map unit makes up about 18 percent of the survey area. It is about 35 percent Peru soils, 35 percent Marlow soils, and 30 percent soils of minor extent (fig. 3).

The Peru soils are moderately well drained and medium textured. They formed in deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and a firm substratum that restricts root growth. These soils are typically in concave areas and on the lower parts of slopes.

The Marlow soils are well drained and medium textured. They formed in deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and a firm substratum that restricts water movement and root growth. These soils are typically on the higher, steeper slopes.

The soils of minor extent in this map unit include Berkshire, Lyman, Pillsbury, and Tunbridge soils. Also of minor extent are areas of organic soils and Rock outcrop. The well drained, very deep Berkshire soils are

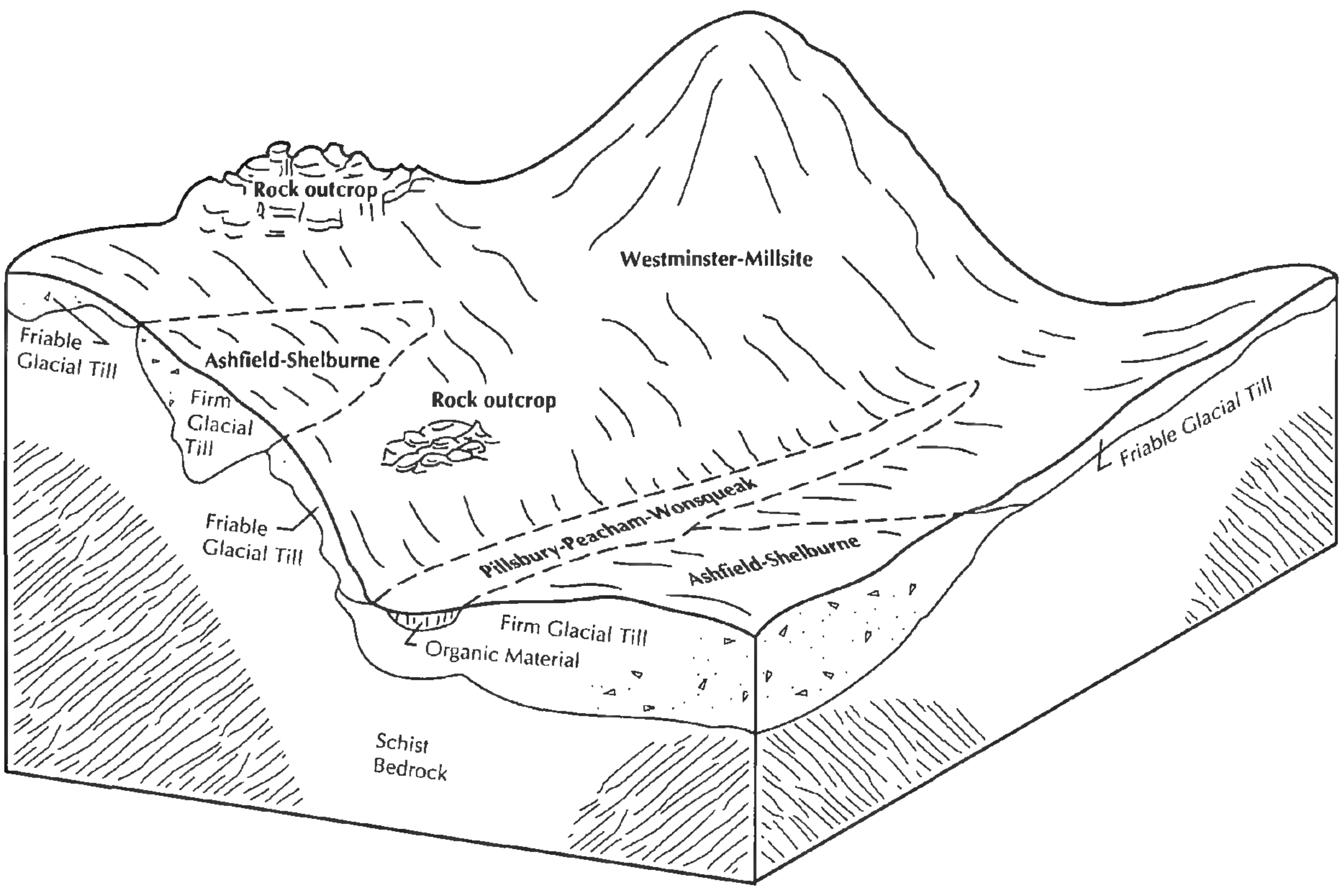

Figure 4.—Pattern of soils and parent material in the Westminster-Millsite general soil map unit.

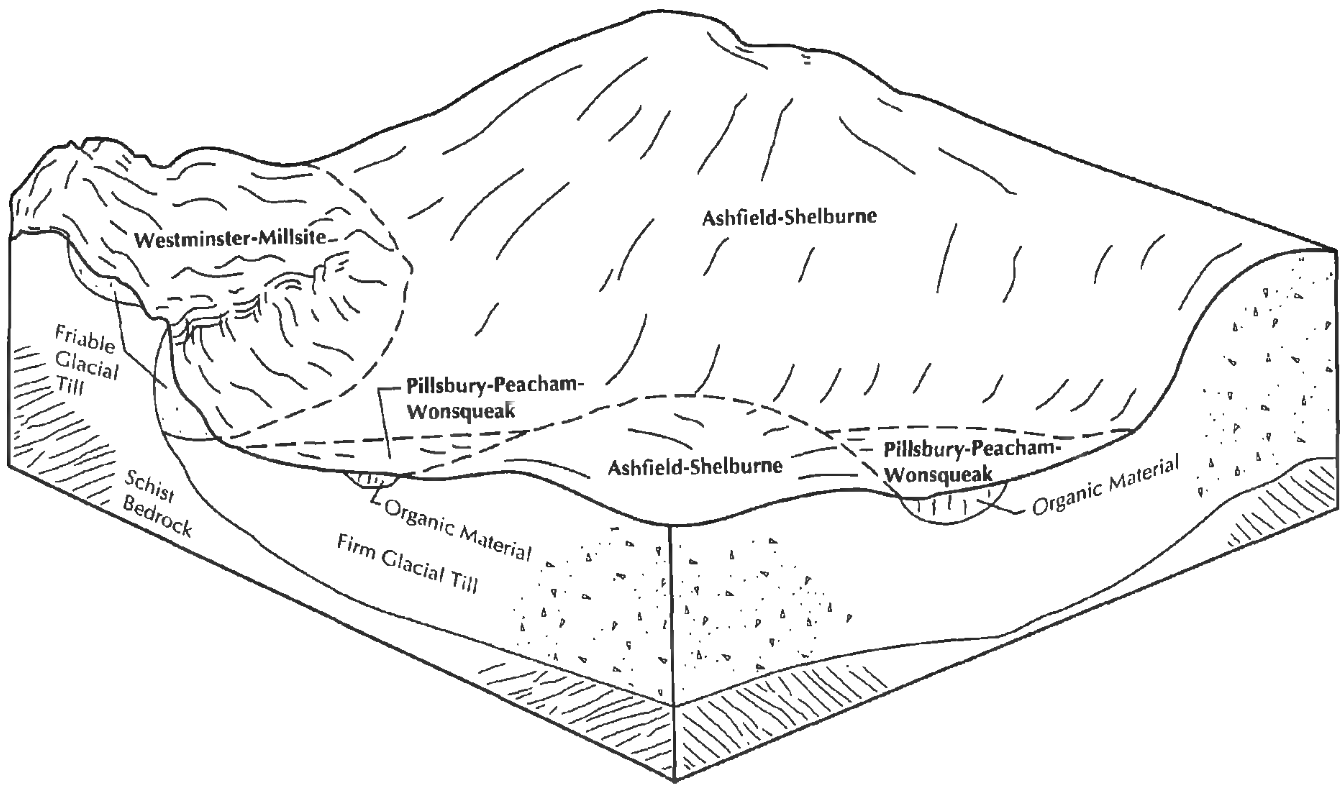

Figure 5.—Pattern of soils and parent material in the Ashfield-Shelburne general soil map unit.

intermingled with areas of the Marlow soils. The poorly drained Pillsbury soils and the very poorly drained organic soils are in low areas or depressions. Tunbridge and Lyman soils and the Rock outcrop are in scattered areas on hillsides and ridges.

Most of the acreage in this map unit is forested. Because of the stones on the surface and the slope, the major soils are poorly suited to cultivated crops, hay, and pasture. The slope and the stoniness are the main limitations affecting building site development and sanitary facilities.

3. Westminster-Millsite

Shallow and moderately deep, somewhat excessively drained and well drained, gently sloping to very steep, frigid, loamy soils formed in glacial till derived from schist, gneiss, and granite; on uplands

This map unit consists of gently sloping to very steep soils on hilltops and hillsides, mainly in the south-central and northeastern parts of the survey area. Rock outcrops are prominent landscape features. Many stones and boulders are on the surface.

This map unit makes up about 17 percent of the survey area. It is about 55 percent Westminster soils, 25 percent Millsite soils, and 20 percent soils of minor extent (fig. 4).

The Westminster soils are shallow, somewhat excessively drained, and medium textured. They formed in thin deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and are underlain by bedrock at a depth of about 16 inches. These soils are typically on the upper, steeper slopes.

The Millsite soils are moderately deep, well drained, and medium textured. They formed in moderately deep deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and are underlain by bedrock at a depth of about 26 inches. These soils are typically in the less sloping areas or pockets between the Westminster soils and bedrock outcrops.

The soils of minor extent in this map unit include Shelburne, Ashfield, and Pillsbury soils. Also of minor extent are areas of organic soils and Rock outcrop. The well drained Shelburne soils are on convex slopes. The moderately well drained Ashfield soils are typically in concave areas and on the lower parts of slopes. The poorly drained Pillsbury soils and the very poorly drained organic soils are in low areas or depressions.

The Rock outcrop is in scattered areas on hillsides and ridges.

Most of the acreage in this map unit is forested. Because of the stones on the surface and the areas of exposed bedrock, the major soils are poorly suited to cultivated crops, hay, and pasture. The slope, the shallowness to bedrock, and the stoniness are the main limitations affecting building site development and sanitary facilities.

4. Ashfield-Shelburne

Very deep, moderately well drained and well drained, gently sloping to very steep, frigid, loamy soils formed in glacial till derived from schist, gneiss, and granite; on uplands

This map unit consists of gently sloping to very steep soils on hilltops and hillsides, mainly in the central and northeastern parts of the survey area. Many stones and boulders are on the surface.

This map unit makes up about 16 percent of the survey area. It is about 60 percent Ashfield soils, 25 percent Shelburne soils, and 15 percent soils of minor extent (fig. 5).

The Ashfield soils are moderately well drained and medium textured. They formed in deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and a firm substratum that restricts root growth. These soils are typically in concave areas and on the lower parts of slopes.

The Shelburne soils are well drained and medium textured. They formed in deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and a firm substratum that restricts water movement and root growth. These soils are typically on the higher, steeper slopes.

The soils of minor extent in this map unit include Pillsbury, Westminster, and Millsite soils. Also of minor extent are areas of organic soils and Rock outcrop. The poorly drained Pillsbury soils and the very poorly drained organic soils are in low areas or depressions. Westminster and Millsite soils and the Rock outcrop are in scattered areas on hillsides and ridges.

Most of the acreage in this map unit is forested. Because of the stones on the surface and the slope, the major soils are poorly suited to cultivated crops, hay, and pasture. The slope and the stoniness are the main

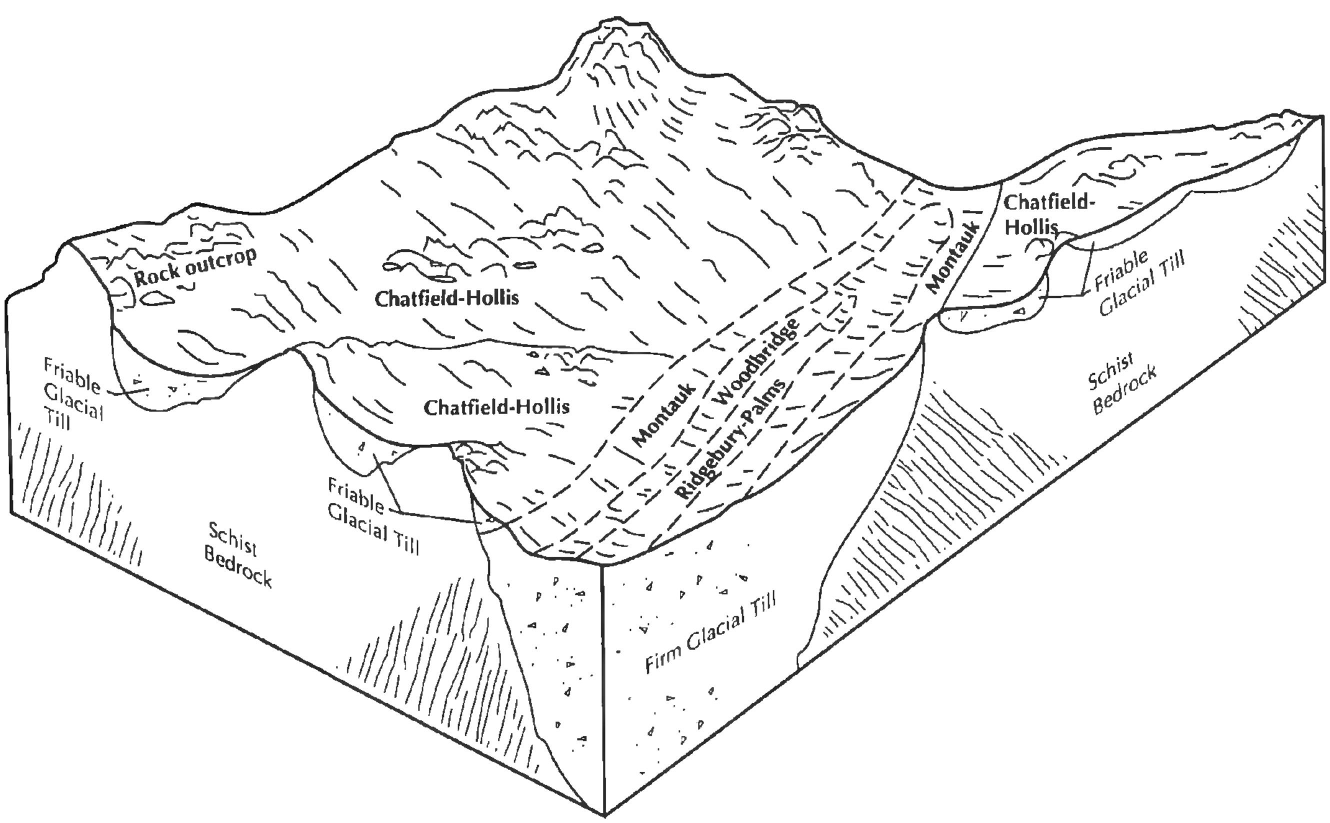

Figure 6.—Pattern of soils and parent material in the Chatfield-Hollis-Montauk general soil map unit.

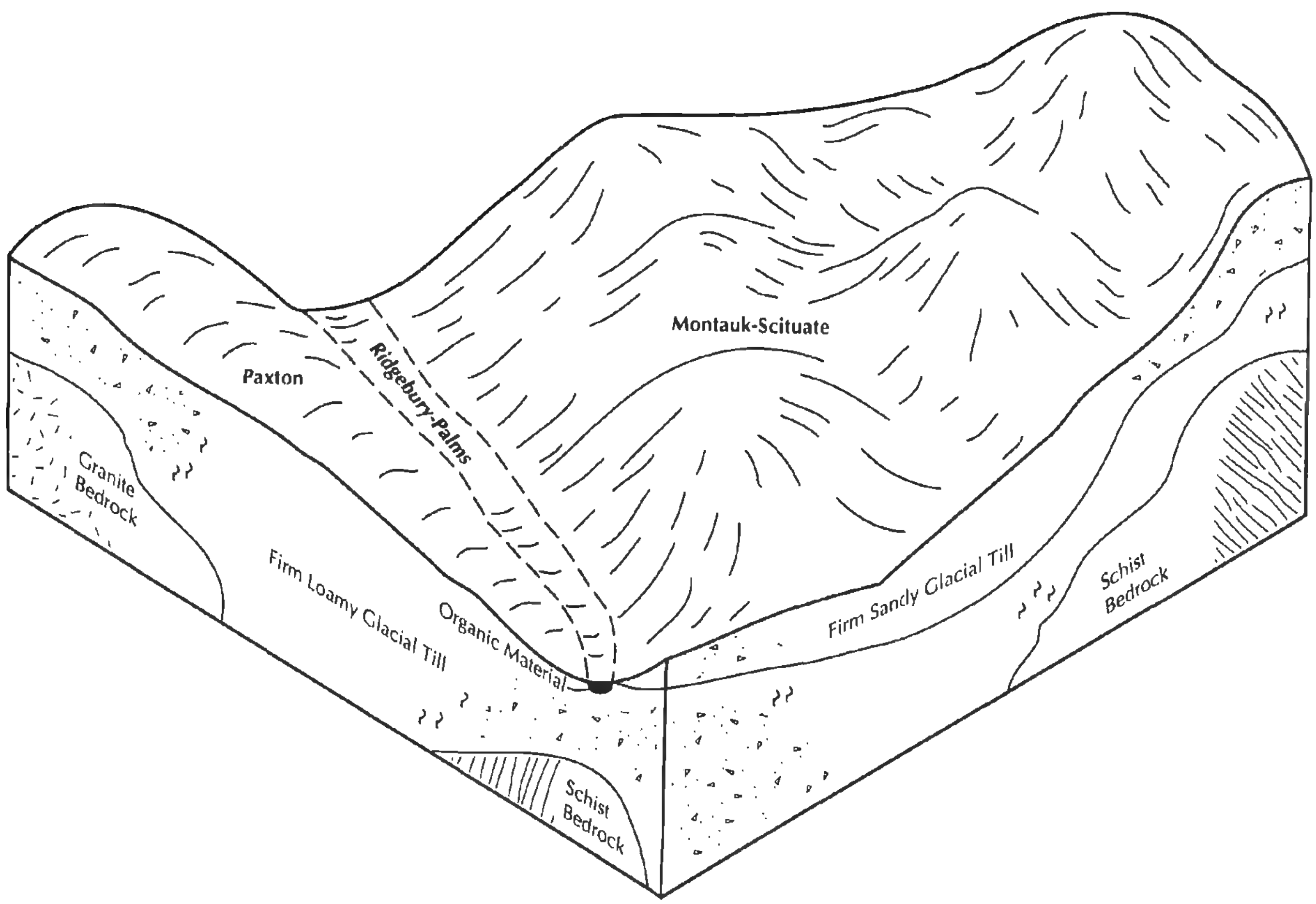

Figure 7.—Pattern of soils and parent material in the Montauk-Paxton-Scituate general soil map unit.

limitations affecting building site development and sanitary facilities.

5. Chatfield-Hollis-Montauk

Moderately deep, shallow, and very deep, well drained and somewhat excessively drained, gently sloping to very steep, mesic, loamy soils formed in glacial till derived from schist, gneiss, and granite; on uplands

This map unit consists of gently sloping to very steep soils on hilltops and hillsides, mainly in the eastern part of the survey area. Rock outcrops are prominent landscape features. Many stones and boulders are on the surface.

This map unit makes up about 14 percent of the survey area. It is about 40 percent Chatfield soils, 35 percent Hollis soils, 15 percent Montauk soils, and 10 percent soils of minor extent (fig. 6).

The Chatfield soils are moderately deep, well drained, and medium textured. They formed in moderately deep deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and are underlain by bedrock at a depth of about 26 inches. These soils are typically in the less sloping areas or pockets between the Hollis soils and bedrock outcrops.

The Hollis soils are shallow, somewhat excessively drained, and medium textured. They formed in thin deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and are underlain by bedrock at a depth of about 16 inches. These soils are typically on the upper, steeper slopes.

The Montauk soils are very deep, well drained, and medium textured. They formed in deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and a firm substratum that restricts water movement and root growth. These soils are typically on the upper parts of slopes and in convex areas.

The soils of minor extent in this map unit include Woodbridge, Paxton, Charlton, and Ridgebury soils. Also of minor extent are areas of organic soils and

Rock outcrop. The well drained, very deep Paxton and Charlton soils are intermingled with areas of the moderately well drained, very deep Woodbridge soils on the upper part of the slopes. The poorly drained Ridgebury soils and the very poorly drained organic soils are in low areas or depressions. The Rock outcrop is in scattered areas on hillsides and ridges.

Most of the acreage in this map unit is forested. Because of the stones on the surface and the areas of exposed bedrock, the major soils are poorly suited to cultivated crops, hay, and pasture. The slope, the shallowness to bedrock, and the stoniness are the main limitations affecting building site development and sanitary facilities.

6. Montauk-Paxton-Scituate

Very deep, well drained and moderately well drained, gently sloping to very steep, mesic, loamy soils formed in glacial till derived from schist, gneiss, and granite; on uplands

This map unit consists of gently sloping to very steep soils on hilltops and hillsides, mainly in the eastern part of the survey area. Many stones and boulders are on the surface.

This map unit makes up about 4 percent of the survey area. It is about 65 percent Montauk soils, 20 percent Paxton soils, 10 percent Scituate soils, and 5 percent soils of minor extent (fig. 7).

The Montauk soils are well drained and medium textured. They formed in deposits of glacial till derived mainly from schist bedrock. They have a friable subsoil and a firm, coarse textured substratum that restricts water movement and root growth. These soils are typically on the higher, steeper slopes.

The Paxton soils are well drained and medium textured. They formed in deposits of glacial till derived mainly from granite, gneiss, and schist bedrock. They have a friable subsoil and a firm substratum that restricts water movement and root growth. These soils are typically on the higher, steeper slopes.

The Scituate soils are moderately well drained and medium textured. They formed in deposits of glacial till derived mainly from granite, gneiss, and schist bedrock. They have a friable subsoil and a firm substratum that restricts root growth. These soils are typically in

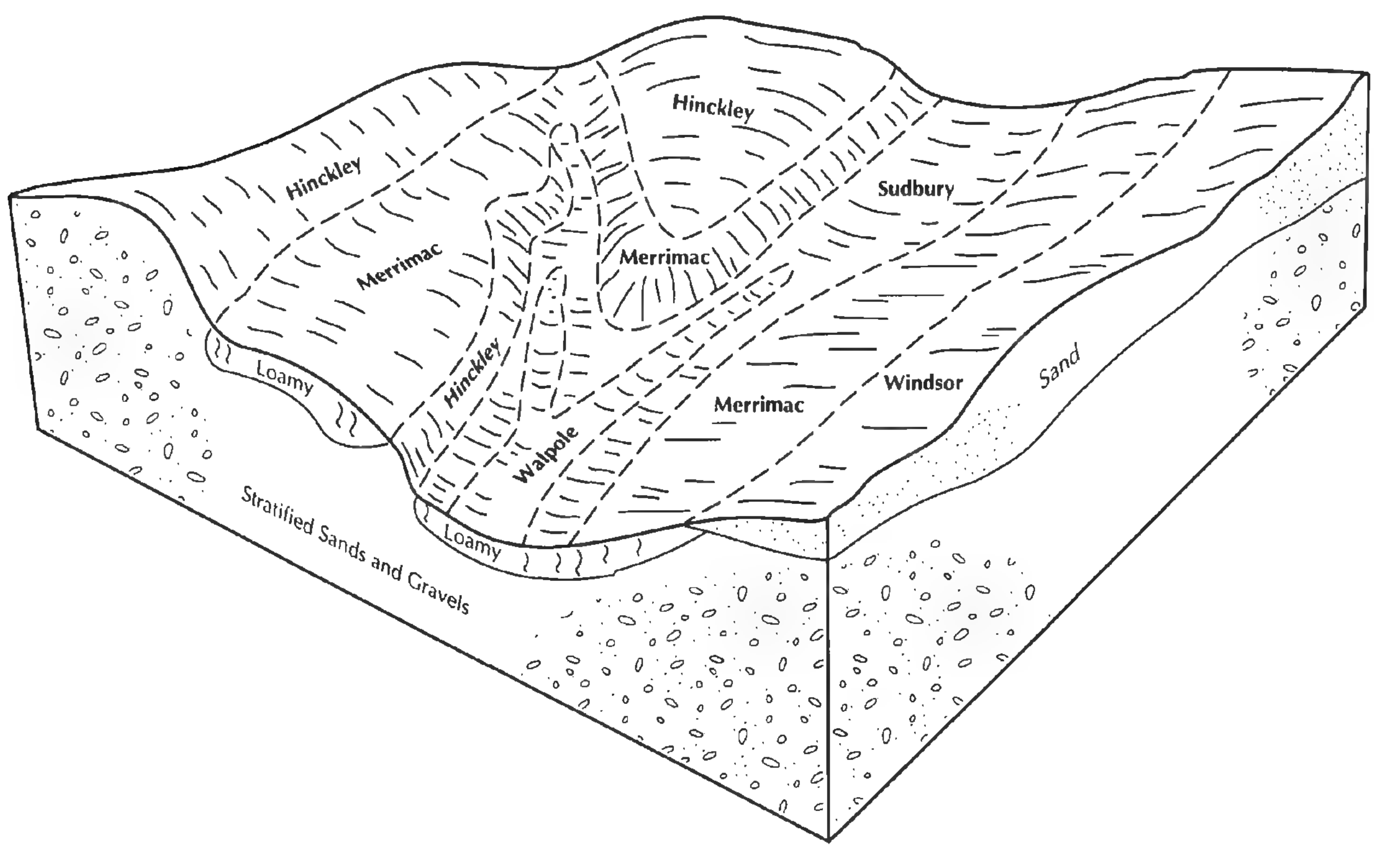

Figure 8.—Pattern of soils and parent material in the Merrimac-Hinckley general soil map unit.

concave areas and on the lower parts of slopes.

The soils of minor extent in this map unit include Ridgebury, Charlton, and Chatfield soils. Also of minor extent are areas of organic soils and Rock outcrop. The well drained, very deep Charlton soils are intermingled with areas of the Montauk and Paxton soils. The poorly drained Ridgebury soils and the very poorly drained organic soils are in low areas or depressions. Chatfield soils and the Rock outcrop are in scattered areas on hillsides and ridges.

Most of the acreage in this map unit is forested. Because of the stones on the surface and the slope, the major soils are poorly suited to cultivated crops, hay, and pasture. The slope and the stoniness are the main limitations affecting building site development and sanitary facilities.

7. Merrimac-Hinckley

Very deep, somewhat excessively drained and excessively drained, nearly level to steep, mesic, loamy soils formed in glacial outwash; on outwash plains and terraces

This map unit consists of nearly level to steep soils on gravelly outwash plains and terraces. It is mainly in valleys.

This map unit makes up about 6 percent of the survey area. It is about 40 percent Merrimac soils, 25 percent Hinckley soils, and 35 percent soils of minor extent (fig. 8).

The Merrimac soils are somewhat excessively drained and moderately coarse textured. They formed in glacial outwash. They have a friable subsoil and a loose, coarse textured substratum.

The Hinckley soils are excessively drained and coarse textured. They formed in glacial outwash. They have a friable subsoil and a loose, coarse textured substratum.

The soils of minor extent in this map unit include the excessively drained Windsor soils and the moderately well drained Sudbury soils. Also of minor extent are the poorly drained Walpole soils in depressions, drainageways, and wet areas and very poorly drained soils that formed in organic material in depressions and drainageways.

Most of the acreage in this map unit has been cleared and is used for agricultural or nonfarm purposes. The major soils are well suited to row crops, small grain, hay, and pasture. Droughtiness may be a limitation in late summer. Water for cultivated crops can be provided by irrigation systems. Erosion is a hazard on the steeper slopes. Stripcropping, minimum tillage, and cover crops help to control runoff and erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and prevent surface compaction in pastured areas.

In most areas the major soils are well suited to building site development and sanitary facilities. The main limitation is a poor filtering capacity caused by rapid or very rapid permeability. The slope is a limitation in the steeper areas. On sites for septic tank absorption fields, installing the distribution lines in a mound of suitable fill material helps to overcome the poor filtering capacity.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Ashfield fine sandy loam, 3 to 8 percent slopes, is a phase of the Ashfield series.

Some map units are made up of two or more major soils. These map units are called soil complexes, soil associations, or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Tunbridge-Lyman complex, 3 to 8 percent slopes, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Ashfield-Shelburne association, rolling, extremely stony, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Hinckley and Windsor soils, steep, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

2—Pootatuck fine sandy loam. This nearly level, very deep, moderately well drained soil is in depressions on flood plains. Individual areas are irregularly shaped and range from 5 to 20 acres in size.

In a typical profile, the surface layer is very dark grayish brown, friable fine sandy loam about 9 inches

Figure 9.—Hay in an area of Pootatuck fine sandy loam.

thick. The subsoil is yellowish brown, mottled, friable fine sandy loam about 11 inches thick. The upper part of the substratum is pale olive, mottled, friable loamy sand that has lenses of coarse sand. The lower part to a depth of 65 inches or more is olive brown, loose gravelly loamy coarse sand.

Included with this soil in mapping are well drained soils on the more convex rises and Rippowam soils in low, concave areas. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderate or moderately rapid in the solum of the Pootatuck soil and rapid or very rapid in the substratum. The available water capacity is high. The seasonal high water table is at a depth of 1.5 to 2.5 feet in winter and early spring. The soil is occasionally flooded, but the floodwater recedes quickly. Flooding is less likely in areas below the Knightville Dam than in unprotected areas. The surface layer is friable and can be easily tilled under proper moisture conditions. Root growth is restricted at a depth of about 18 to 24 inches by the seasonal high water table in early spring. The soil is very strongly acid to slightly acid.

Most areas are cultivated. Areas where farming has been phased out are covered with brush and trees.

This soil is well suited to row crops and small grain. Wetness is the main limitation, and flooding is a hazard. Open-ditch drainage systems can help to remove excess surface water in areas that are not flooded. Returning crop residue to the soil helps to increase or maintain the content of organic matter in the surface layer.

This soil is well suited to grasses and legumes for hay (fig. 9) or pasture. Proper stocking rates, timely deferment of grazing, and pasture rotation help to

maintain desirable species of pasture plants.

The potential productivity for red maple is moderate. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is needed for the best growth of newly established seedlings. Pruning is needed to improve the quality of white pine.

This soil is generally unsuitable for building site development and septic tank absorption fields because of the hazard of flooding and the seasonal high water table. Soils that are better suited to these uses are generally nearby. Constructing on raised, well compacted fill material and providing adequate roadside ditches and culverts help to protect local roads from the damage caused by flooding and frost action.

The land capability classification is IIw.

4—Rippowam very fine sandy loam. This nearly level, very deep, poorly drained soil is in depressions on flood plains. Individual areas are irregularly shaped and range from 5 to 10 acres in size.

In a typical profile, the surface layer is very dark gray, friable very fine sandy loam about 10 inches thick. The upper part of the substratum is grayish brown, mottled fine sandy loam and sandy loam. The lower part to a depth of 65 inches or more is gray to yellowish brown, loose sand and coarse sand and gravel.

Included with this soil in mapping are the moderately well drained Pootatuck soils in the more convex areas. Also included, in the lower, concave areas, are soils that are more poorly drained than the Rippowam soil. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderate or moderately rapid in the solum of the Rippowam soil and rapid or very rapid in the substratum. The available water capacity is high. The seasonal high water table is at or near the surface in winter and spring. The soil is frequently flooded. Flooding is less likely in areas below the Knightville Dam than in unprotected areas. The surface layer is friable and can be easily tilled under proper moisture conditions. Root growth is restricted at a depth of about 18 inches by the seasonal high water table in early spring. The soil is very strongly acid to neutral throughout.

Most areas are used as woodland. Some areas are used for cultivated crops, hay, or pasture.

This soil is poorly suited to row crops and small grain. Wetness and flooding are the main limitations. If suitable outlets are available, a surface drainage system can help to remove excess water.

This soil is fairly well suited to grasses and legumes for hay or pasture. The forage species that can tolerate wetness grow best. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for red maple is moderately high. The main management concerns are the seasonal high water table, a high seedling mortality rate, and the hazard of windthrow. The use of equipment is limited by low soil strength unless the soil is dry or frozen. When a stand is thinned, measures that reduce the hazard of windthrow are needed. This hazard can be reduced by keeping the residual stand density at or slightly above standard stocking levels and by limiting changes in stand density to 30 percent or less.

This soil is unsuitable for building site development and septic tank absorption fields because of the hazard of flooding and the seasonal high water table. Soils that are better suited to these uses are generally nearby. Constructing on raised, coarse textured fill material and providing adequate roadside ditches and culverts help to protect local roads from the damage caused by flooding, wetness, and frost action.

The land capability classification is IVw.

31—Walpole fine sandy loam. This nearly level, very deep, poorly drained soil is in shallow drainageways and low areas on outwash plains and stream terraces. Individual areas are irregularly shaped and range from 5 to 15 acres in size.

In a typical profile, the surface layer is very dark grayish brown, friable fine sandy loam about 4 inches thick. The subsoil is about 14 inches thick. It is brown and dark grayish brown, mottled, and friable. It is fine sandy loam in the upper part and sandy loam in the lower part. The substratum to a depth of 65 inches or more is dark grayish brown, loose sand and gravel.

Included in mapping are areas of the moderately well drained Sudbury soils and areas of mineral soils that are wetter than the Walpole soil. Also included, at the edges of a few mapped areas, are soils that are gently sloping. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderately rapid in the subsoil of the Walpole soil and rapid or very rapid in the substratum. The available water capacity is moderate. The seasonal high water table is at or near the surface in winter and early spring. It restricts root growth. The soil is very strongly acid to slightly acid.

Most areas are covered with trees.

This soil is poorly suited to row crops and small grain. Wetness is the main limitation. A surface

drainage system can help to remove excess water if suitable outlets are available.

This soil is fairly well suited to grasses and legumes for hay or pasture. The forage species that can tolerate wetness grow best. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for red maple is moderate. The main management concerns are the seasonal high water table, a high seedling mortality rate, and the hazard of windthrow. The use of equipment is limited by low soil strength unless the soil is dry or frozen. When a stand is thinned, measures that reduce the hazard of windthrow are needed. This hazard can be reduced by keeping the residual stand density at or slightly above standard stocking levels and by limiting changes in stand density to 30 percent or less.

This soil is unsuitable for building site development and septic tank absorption fields because of the seasonal high water table. Soils that are better suited to these uses are generally nearby. Constructing on raised, coarse textured fill material and providing adequate roadside ditches and culverts help to protect local roads from the damage caused by wetness and frost action.

The land capability classification is IVw.

57—Lupton muck. This nearly level, very deep, very poorly drained soil formed in organic material on low glacial till plains and outwash plains. It is frequently ponded. Individual areas are irregularly shaped and range from 10 to 100 acres in size.

Typically, this soil consists of black, dark reddish brown, and dark brown, decomposed organic material to a depth of about 65 inches.

Included with this soil in mapping are the very deep, very poorly drained, mineral Peacham soils and the very poorly drained, shallow, organic Wonsqueak soils around the perimeter of the mapped areas. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderately slow to moderately rapid in the Lupton soil. The available water capacity is high. The seasonal high water table is near or above the surface most of the year. It restricts root growth. The soil is moderately acid or slightly acid.

All of the acreage is idle land. Most areas are covered with brush and trees (fig. 10). Because of the high water table, this soil is poorly suited to most types of cultivated crops and to hay and pasture.

The potential productivity for red maple is moderate. The main limitations are the seasonal high water table, a high seedling mortality rate, and the hazard of windthrow. Growth and survival rates are poor. The use of equipment is limited by low soil strength. When a stand is thinned, measures that reduce the hazard of windthrow are needed. This hazard can be reduced by keeping the residual stand density at or slightly above standard stocking levels and by limiting changes in stand density to 30 percent or less. Onsite investigation is needed to identify areas where tree planting is practical if special management is applied.

This soil is generally unsuitable for building site development because of the wetness and the structural damage caused by low soil strength. The soil is unsuitable as a site for septic tank absorption fields because of the ponding and the wetness. Soils that are better suited to these uses are generally nearby.

The land capability classification is VIw.

120B—Millsite-Westminster complex, 3 to 8 percent slopes, very rocky. These soils are in gently sloping areas on the sides and top of hills and mountains. The moderately deep, well drained Millsite soil typically is on the flatter parts of slopes between areas of the shallow, somewhat excessively drained Westminster soil and areas of bedrock outcrops. Individual areas are irregularly shaped and range from 5 to 30 acres in size. This unit is about 40 percent Millsite soil, 40 percent Westminster soil, 10 percent other soils, and 10 percent rock outcrops.

Typically, the surface layer of the Millsite soil is very dark grayish brown, friable loam about 6 inches thick. The subsoil is about 29 inches thick. The upper part is dark yellowish brown and light olive brown, friable fine sandy loam. The lower part is olive brown, friable gravelly fine sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Westminster soil is very dark grayish brown, friable loam about 3 inches thick. The subsoil is about 15 inches thick. The upper part is dark yellowish brown, friable loam; the next part is brown, friable fine sandy loam; and the lower part is dark brown, friable sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Included with these soils in mapping are areas of rock outcrop and the very deep Ashfield and Shelburne soils. Also included are poorly drained and very poorly drained soils in some depressions and nearly level areas and soils that have slopes of less than 3 percent or more than 8 percent. Included areas make up about 10 to 15 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the Millsite soil and moderately rapid in the Westminster soil. The available water capacity is moderate in the Millsite soil and low in the Westminster soil. Bedrock is

Figure 10.—Typical vegetation in an area of Lupton muck.

at a depth of 20 to 40 inches in the Millsite soil and within a depth of 20 inches in the Westminster soil. The rooting depth is limited by the shallowness to bedrock in the Westminster soil. The soils are very strongly acid to slightly acid.

Most areas are used as woodland. Because of the shallowness to bedrock and the exposed bedrock, these soils are poorly suited to cultivated crops and to hay and pasture.

The potential productivity for sugar maple is moderate. Windthrow is a moderate hazard because of the shallowness to bedrock. Generally, the soils are droughty. In some years seedling mortality is severe. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and conserve soil moisture. Thinning generally should be avoided because of the hazard of windthrow. Removing and controlling competing understory vegetation can increase the growth and survival rates of newly planted trees.

Excavating during building site development may be difficult because of the underlying bedrock. In most areas the bedrock is very hard. It can hinder road construction. Large machinery is generally required for excavations. The shallowness to bedrock is the main limitation on sites for septic tank absorption fields. The bedrock can prohibit the installation of distribution lines.

The included soils may be better suited to intended land uses than the Millsite and Westminster soils or have limitations that are more severe. Onsite

investigation is needed to assess the suitability of particular areas.

The land capability classification is VIs.

121C—Millsite-Westminster-Rock outcrop complex, 8 to 15 percent slopes. This map unit is in strongly sloping areas on the sides and top of hills and mountains. The moderately deep, well drained Millsite soil typically is on the flatter parts of slopes between areas of the shallow, somewhat excessively drained Westminster soil and areas of bedrock outcrops. Individual areas are irregularly shaped and range from 5 to 30 acres in size. This unit is about 40 percent Millsite soil, 35 percent Westminster soil, 10 percent other soils, and 15 percent Rock outcrop.

Typically, the surface layer of the Millsite soil is very dark grayish brown, friable loam about 6 inches thick. The subsoil is about 29 inches thick. The upper part is dark yellowish brown, friable fine sandy loam; the next part is light olive brown fine sandy loam; and the lower part is olive brown, friable gravelly fine sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Westminster soil is very dark grayish brown, friable loam about 3 inches thick. The subsoil is about 15 inches thick. The upper part is dark yellowish brown, friable loam; the next part is brown, friable fine sandy loam; and the lower part is dark brown, friable sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

The Rock outcrop is schist, gneiss, or granite.

Included in this unit in mapping are areas of the very deep Shelburne and Ashfield soils. Also included are poorly drained and very poorly drained soils in some depressions and nearly level areas and soils that have slopes of less than 8 percent or more than 15 percent. Included areas make up about 10 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the Millsite soil and moderately rapid in the Westminster soil. The available water capacity is moderate in the Millsite soil and low in the Westminster soil. Bedrock is at a depth of 20 to 40 inches in the Millsite soil and within a depth of 20 inches in the Westminster soil. The rooting depth is limited by the shallowness to bedrock in the Westminster soil. The soils are very strongly acid to slightly acid.

Most areas are used as woodland. Because of the shallowness to bedrock and the exposed bedrock, these soils are poorly suited to cultivated crops and to hay and pasture.

The potential productivity for sugar maple is moderate. Windthrow is a moderate hazard because of the shallowness to bedrock. Generally, the soils are droughty. In some years seedling mortality is severe. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and conserve soil moisture. Thinning generally should be avoided because of the hazard of windthrow. Removing and controlling competing understory vegetation can increase the growth and survival rates of newly planted trees.

Excavating during building site development may be difficult because of the underlying bedrock. In most areas the bedrock is very hard. It can hinder road construction. Large machinery is generally required for excavations. The shallowness to bedrock is the main limitation on sites for septic tank absorption fields. The bedrock can hinder the installation of distribution lines.

The included soils may be better suited to intended land uses than the Millsite and Westminster soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

122B—Tunbridge-Lyman complex, 3 to 8 percent slopes. These soils are in gently sloping areas on the sides and top of hills and mountains. The moderately deep, well drained Tunbridge soil typically is on the flatter parts of slopes between areas of the shallow, somewhat excessively drained Lyman soil and areas of bedrock outcrops. Individual areas are irregularly shaped and range from 5 to 40 acres in size. This unit is about 50 percent Tunbridge soil, 40 percent Lyman soil, and 10 percent other soils and rock outcrops.

Typically, the surface layer of the Tunbridge soil is black, friable loam about 3 inches thick. The subsoil is about 21 inches thick. The upper part is 3 inches of light gray fine sandy loam over 8 inches of reddish brown to strong brown, friable loam. The lower 10 inches is dark brown, friable loam. The underlying bedrock typically is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Lyman soil is black, friable loam about 1 inch thick. The subsoil is about 16 inches thick. The upper part is 2 inches of gray fine sandy loam over 6 inches of dark reddish brown to dark brown, friable loam and fine sandy loam. The lower 8 inches is dark yellowish brown to brown, friable fine sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Included with these soils in mapping are areas of rock outcrop and the deep Marlow soils. Also included, in some depressions and nearly level areas, are soils that are more poorly drained than the Tunbridge and

Lyman soils. Included areas make up about 10 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the Tunbridge soil and moderately rapid in the Lyman soil. The available water capacity is moderate in the Tunbridge soil and low in the Lyman soil. Bedrock is at a depth of 20 to 40 inches in the Tunbridge soil and within a depth of 20 inches in the Lyman soil. The rooting depth is limited by the shallowness to bedrock. The soils are very strongly acid or strongly acid.

Most areas are used as woodland. Because of the shallowness to bedrock and the exposed bedrock, these soils are poorly suited to cultivated crops and to hay and pasture.

The potential productivity for sugar maple is moderate. Windthrow is a moderate hazard because of the shallowness to bedrock. Generally, the soils are droughty. In some years seedling mortality is severe. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and conserve soil moisture. Thinning generally should be avoided because of the hazard of windthrow. Removing and controlling competing understory vegetation can increase the growth and survival rates of newly planted trees.

Excavating during building site development may be difficult because of the underlying bedrock. In most areas the bedrock is very hard. It can hinder road construction. Large machinery is generally required for excavations. The shallowness to bedrock is the main limitation on sites for septic tank absorption fields. The bedrock can hinder the installation of distribution lines.

The included soils may be better suited to intended land uses than the Tunbridge and Lyman soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is IIIe.

122C—Tunbridge-Lyman complex, 8 to 15 percent slopes. These strongly sloping soils are on the sides of hills and mountains. The moderately deep, well drained Tunbridge soil typically is on the flatter parts of slopes between areas of the shallow, somewhat excessively drained Lyman soil and areas of bedrock outcrops. Individual areas are irregularly shaped and range from 5 to 30 acres in size. This unit is about 55 percent Tunbridge soil, 20 percent Lyman soil, and 25 percent other soils and rock outcrops.

Typically, the surface layer of the Tunbridge soil is black, friable loam about 3 inches thick. The subsoil is about 21 inches thick. The upper part is 3 inches of light gray, friable fine sandy loam over 8 inches of reddish brown to strong brown, friable loam. The lower 10 inches is dark brown, friable loam. The underlying bedrock typically is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Lyman soil is black, friable loam about 1 inch thick. The subsoil is about 16 inches thick. The upper part is 2 inches of gray fine sandy loam over 6 inches of dark reddish brown to dark brown, friable loam and fine sandy loam. The lower 8 inches is dark yellowish brown to brown, friable fine sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Included with these soils in mapping are areas of rock outcrop and the deep Marlow soils. Also included, in some depressions and drainageways, are soils that are more poorly drained than the Tunbridge and Lyman soils. Included areas make up about 25 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the Tunbridge soil and moderately rapid in the Lyman soil. The available water capacity is moderate in the Tunbridge soil and low in the Lyman soil. Bedrock is at a depth of 20 to 40 inches in the Tunbridge soil and within a depth of 20 inches in the Lyman soil. The rooting depth is limited by the shallowness to bedrock. The soils are very strongly acid or strongly acid.

Most areas are used as woodland. Because of the shallowness to bedrock and the exposed bedrock, these soils are poorly suited to cultivated crops and to hay and pasture.

The potential productivity for sugar maple is moderate. Windthrow is a moderate hazard because of the shallowness to bedrock. Generally, the soils are droughty. In some years seedling mortality is severe. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and conserve soil moisture. Thinning generally should be avoided because of the hazard of windthrow. Removing and controlling competing understory vegetation can increase the growth and survival rates of newly planted trees.

Excavating during building site development may be difficult because of the underlying bedrock. In most areas the bedrock is very hard or cemented. It can hinder road construction. Large machinery is generally required for excavations. The shallowness to bedrock is the main limitation on sites for septic tank absorption fields. The bedrock can hinder the installation of distribution lines.

The included soils may be better suited to intended land uses than the Tunbridge and Lyman soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is IVe.

253B—Hinckley very gravelly sandy loam, 3 to 8 percent slopes. This gently sloping, very deep, excessively drained soil is in slightly convex areas on stream terraces and outwash plains. Individual areas are irregularly shaped and range from 5 to 150 acres in size.

Typically, the surface layer is black, friable very gravelly sandy loam about 8 inches thick. The subsoil is very friable very gravelly loamy sand about 8 inches thick. The upper 2 inches is dark reddish brown, and the lower 6 inches is reddish brown. The substratum to a depth of 65 inches or more is strong brown, loose sand and gravel.

Included with this soil in mapping are a few areas of soils that have less than 15 percent gravel, by volume, in the substratum; Merrimac and Windsor soils in most of the mapped areas; and Sudbury soils in slightly concave depressions. Also included, at the edges of a few mapped areas, are soils that have slopes of more than 8 percent. Included areas make up about 10 to 15 percent of the unit.

Permeability is rapid or very rapid in the subsoil of the Hinckley soil and very rapid in the substratum. The available water capacity is very low. The soil is droughty in summer. The surface layer can be easily tilled under proper moisture conditions. The root zone is restricted by the sand and gravel at a depth of about 17 inches. Reaction ranges from extremely acid to moderately acid throughout the profile.

Most areas are cultivated. A few areas are used as woodland.

This soil is fairly well suited to row crops and small grain. The main limitation is droughtiness. Returning crop residue to the soil helps to maintain or increase the content of organic matter in the surface layer.

This soil is fairly well suited to grasses and legumes for hay or pasture. The forage species that can tolerate drought in summer produce the highest yields. The main management concern is overgrazing, which causes surface compaction and reduces the hardiness and density of plants. Proper stocking rates and timely grazing help to maintain desirable species of pasture plants and prevent surface compaction.

The potential productivity for eastern white pine is high. The main management concern is the moisture stress caused by the very low available water capacity. Thinning crowded stands to standard stocking levels and removing diseased, deformed, or otherwise undesirable trees allow more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is needed for the best growth of newly established seedlings. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration. Regeneration cuts that preserve as many shade trees as possible reduce the rate of evapotranspiration and thus conserve soil moisture.

No major limitations affect the use of this soil as a site for buildings or local roads. Ground-water contamination is a hazard on sites for septic tank absorption fields because of the rapid or very rapid permeability. The soil readily absorbs but does not adequately filter the effluent. Where this soil is mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The land capability classification is IIIs.

253C—Hinckley very gravelly sandy loam, 8 to 15 percent slopes. This strongly sloping, very deep, excessively drained soil is in elongated or irregularly shaped areas. Slopes are convex and are as much as 200 feet long. Individual areas range from 5 to 80 acres in size.

Typically, the surface layer is black, friable very gravelly sandy loam about 8 inches thick. The subsoil is very friable very gravelly loamy sand about 8 inches thick. The upper 2 inches is dark reddish brown, and the lower 6 inches is reddish brown. The substratum to a depth of 65 inches or more is strong brown, loose sand and gravel.

Included with this soil in mapping are areas where some of the original surface layer has been removed by erosion. Also included are the somewhat excessively drained Merrimac and excessively drained Windsor soils in most of the mapped areas and the moderately well drained Sudbury soils at the base of some slopes. Included areas make up about 5 to 10 percent of the unit.

Permeability is rapid or very rapid in the subsoil of the Hinckley soil and very rapid in the substratum. The available water capacity is low. The soil is droughty in summer. The root zone is restricted by the loose sand and gravel at a depth of about 17 inches. Reaction ranges from extremely acid to moderately acid throughout the profile.

Most areas are used for hay or pasture. A few areas are covered with mixed brush and trees.

This soil is poorly suited to row crops and small grain. The main limitation is droughtiness. Erosion is a hazard. Conservation tillage, a crop rotation that includes grasses and legumes, contour farming, or a combination of these can help to control erosion.

This soil is poorly suited to grasses and legumes for hay or pasture. The forage species that can tolerate drought in summer produce the highest yields. The

main management concern is overgrazing, which causes surface compaction, increases the runoff rate, and reduces the hardiness and density of plants. Proper stocking rates and timely grazing help to maintain desirable species of pasture plants, prevent surface compaction, and control runoff.

The potential productivity for eastern white pine is high. The main management concern is the moisture stress caused by the low available water capacity. Thinning crowded stands to standard stocking levels and removing diseased, deformed, or otherwise undesirable trees allow more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is needed for the best growth of newly established seedlings. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration. Regeneration cuts that preserve as many shade trees as possible reduce the rate of evapotranspiration and thus conserve soil moisture.

If this soil is used for building site development, designing the buildings so that they conform to the natural slope of the land can help to overcome the slope and control erosion in disturbed areas. Land shaping is needed in some areas. Constructing local roads on the contour, if possible, and planting suitable grasses on roadbanks help to control erosion. Ground-water contamination is a hazard on sites for septic tank absorption fields because of the rapid or very rapid permeability. The soil readily absorbs but does not adequately filter the effluent.

The land capability classification is IVs.

254A—Merrimac fine sandy loam, 0 to 3 percent slopes. This nearly level, very deep, somewhat excessively drained soil is on slightly convex ridges. Individual areas are irregularly shaped and range from 5 to 200 acres in size.

Typically, the surface layer is dark yellowish brown, very friable fine sandy loam about 9 inches thick. The subsoil is about 24 inches thick. The upper 17 inches is yellowish brown, very friable gravelly sandy loam. The lower 7 inches is yellowish brown, very friable gravelly loamy sand. The substratum to a depth of 65 inches or more is light yellowish brown, loose very gravelly sand.

Included with this soil in mapping are a few small areas where the content of rock fragments is less than 25 percent, by volume, in the substratum and areas of Hinckley, Sudbury, and Windsor soils. Hinckley, Sudbury, and Windsor soils are in most of the mapped areas. Also included, at the edges of a few mapped areas, are soils that have slopes of more than 3 percent. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderately rapid or rapid in the subsoil of the Merrimac soil and rapid or very rapid in the substratum. The available water capacity is moderate. The soil is droughty in late summer. The surface layer can be easily tilled under the proper moisture conditions. The root zone is restricted by the loose sand and gravel at a depth of about 21 inches. Reaction ranges from very strongly acid to moderately acid throughout the profile.

Most areas are used for cultivated crops. A few areas are used as woodland.

This soil is well suited to row crops and small grain. The main limitation is droughtiness. Returning crop residue to the soil helps to maintain or increase the content of organic matter in the surface layer.

This soil is well suited to grasses and legumes for hay or pasture. The forage species that can tolerate drought in late summer produce the highest yields. The main management concern is overgrazing, which causes surface compaction and reduces the hardiness and density of plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and prevent surface compaction.

The potential productivity for eastern white pine is high. Seeding mortality is moderate because of the moisture stress caused by the moderate available water capacity. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and conserve soil moisture. Removing or controlling competing understory vegetation allows more vigorous growth and regeneration of preferred trees.

No major limitations affect the use of this soil as a site for buildings or local roads. Ground-water contamination is a hazard on sites for septic tank absorption fields because of the rapid permeability. The soil readily absorbs but does not adequately filter the effluent. Where this soil is mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The land capability classification is IIs.

254B—Merrimac fine sandy loam, 3 to 8 percent slopes. This gently sloping, very deep, somewhat excessively drained soil is on slightly convex ridges. Individual areas are irregularly shaped and range from 5 to 200 acres in size.

Typically, the surface layer is dark yellowish brown, very friable fine sandy loam about 9 inches thick. The subsoil is about 24 inches thick. The upper 17 inches is yellowish brown, very friable gravelly sandy loam. The lower 7 inches is yellowish brown, very friable gravelly

loamy sand. The substratum to a depth of 65 inches or more is light yellowish brown, loose very gravelly sand.

Included with this soil in mapping are a few small areas where the content of gravel is less than 25 percent, by volume, in the substratum and small areas of Hinckley, Windsor, and Sudbury soils. Also included are areas of soils that have slopes of less than 3 percent or more than 8 percent. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderately rapid or rapid in the subsoil of the Merrimac soil and rapid or very rapid in the substratum. The available water capacity is moderate. The soil is droughty in late summer. The surface layer can be easily tilled under the proper moisture conditions. The root zone is restricted by the loose sand and gravel at a depth of about 21 inches. Reaction ranges from very strongly acid to moderately acid throughout the profile.

Most areas are used for cultivated crops. A few areas are used as woodland.

This soil is well suited to row crops and small grain. Droughtiness is the main limitation. Returning crop residue to the soil helps to maintain or increase the content of organic matter in the surface layer.

This soil is well suited to grasses and legumes for hay or pasture. The forage species that can tolerate drought in late summer produce the highest yields. The main management concern is overgrazing, which causes surface compaction and reduces the hardiness and density of plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and prevent surface compaction.

The potential productivity for eastern white pine is high. Seedling mortality is moderate because of the moisture stress caused by the moderate available water capacity. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and conserve soil moisture. Removing and controlling competing understory vegetation allows more vigorous growth and regeneration of preferred trees.

No major limitations affect the use of this soil as a site for buildings or local roads. Ground-water contamination is a hazard on sites for septic tank absorption fields because of the rapid permeability. The soil readily absorbs but does not adequately filter the effluent. Where this soil is mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The land capability classification is IIs.

254C—Merrimac fine sandy loam, 8 to 15 percent slopes. This strongly sloping, very deep, somewhat excessively drained soil is in elongated or irregularly shaped areas. Slopes are convex and are as much as 300 feet long. Individual areas range from 5 to 40 acres in size.

Typically, the surface layer is dark yellowish brown, very friable fine sandy loam about 9 inches thick. The subsoil is about 24 inches thick. The upper 17 inches is yellowish brown, very friable gravelly sandy loam. The lower 7 inches is yellowish brown, very friable gravelly loamy sand. The substratum to a depth of 65 inches or more is light yellowish brown, loose very gravelly sand.

Included with this soil in mapping are a few areas where some of the original surface layer has been removed by erosion, a few areas where the subsoil has more than 15 percent rock fragments, and small areas of Hinckley and Windsor soils. Also included are areas of soils that have slopes of more than 15 percent. Included areas make up about 10 to 15 percent of the unit.

Permeability is moderately rapid or rapid in the subsoil of the Merrimac soil and rapid or very rapid in the substratum. The available water capacity is moderate. The soil is droughty in late summer. The surface layer can be easily tilled under proper moisture conditions. The root zone is restricted by the loose sand and gravel at a depth of about 21 inches. Reaction ranges from very strongly acid to moderately acid throughout the profile.

Many areas are used for cultivated crops. A few areas are covered with mixed brush and trees.

This soil is fairly well suited to row crops and small grain. Erosion is a hazard. Droughtiness is the main limitation. Conservation tillage, a crop rotation that includes grasses and legumes, contour farming, or a combination of these can help to control erosion.

This soil is well suited to grasses and legumes for hay or pasture. The forage species that can tolerate drought in late summer produce the highest yields. The main management concern is overgrazing, which causes surface compaction, increases the runoff rate, and reduces the hardiness and density of plants. Proper stocking rates, timely grazing, and restricted grazing during wet periods help to maintain desirable species of pasture plants, prevent surface compaction, and control runoff.

The potential productivity for eastern white pine is high. The hazard of erosion is the main management concern in disturbed areas. Plant competition is moderate if conifers are grown. Constructing access roads and trails on the contour and installing water bars can help to control erosion. Removing undesirable stock, such as dead or diseased trees, and thinning dense stands allow more vigorous growth and regeneration of preferred trees. Removing and controlling competing understory vegetation allow the

best growth of newly established seedlings. Pruning improves the quality of white pine and red pine.

If this soil is used for building site development, designing the buildings so that they conform to the natural slope of the land can help to overcome the slope and control erosion in disturbed areas. Land shaping is needed in some areas. Constructing local roads on the contour, if possible, and planting suitable grasses on roadbanks help to control erosion. Ground-water contamination is a hazard on sites for septic tank absorption fields because of the rapid permeability. The soil readily absorbs but does not adequately filter the effluent. Where this soil is mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The land capability classification is IIIe.

255B—Windsor loamy fine sand, 1 to 5 percent slopes. This gently sloping, very deep, excessively drained soil is on high stream terraces and outwash plains. Individual areas are irregularly shaped and range from 5 to 15 acres in size.

Typically, the surface layer is dark brown, very friable loamy fine sand about 4 inches thick. The upper 10 inches of the subsoil is yellowish brown, very friable loamy sand. The lower 8 inches is light olive brown, loose loamy sand. The substratum to a depth of 65 inches or more is pale olive, loose sand.

Included with this soil in mapping are a few small areas of the excessively drained Hinckley and somewhat excessively drained Merrimac soils. Also included are soils that have slopes of less than 1 percent or more than 5 percent. Included areas make up about 5 to 10 percent of the unit.

Permeability is rapid or very rapid in the subsoil and substratum of the Windsor soil. The available water capacity is moderate. The soil is droughty in summer. The surface layer can be easily tilled under proper moisture conditions. The root zone is restricted by the loose sand at a depth of about 22 inches. Reaction ranges from extremely acid to moderately acid throughout the profile.

Most areas have been cleared of trees and are used for row crops or hay. A few small areas have reverted to woodland (fig. 11).

This soil is fairly well suited to cultivated crops. The main limitation is droughtiness. Some erosion can be expected if the plant cover is removed. If cultivated crops are grown, a cropping system that keeps erosion within tolerable limits is needed. Returning crop residue to the soil helps to maintain or increase the content of organic matter in the surface layer.

This soil is fairly well suited to grasses and legumes for hay or pasture. The forage species that can tolerate drought produce the highest yields. The main management concern is overgrazing, which causes surface compaction and reduces the hardiness and density of plants. Proper stocking rates and timely grazing help to maintain desirable species of pasture plants and prevent surface compaction.

The potential productivity for eastern white pine is high. The main management concern is the moisture stress caused by the limited available water capacity. Thinning crowded stands to standard stocking levels and removing diseased, deformed, or otherwise undesirable trees allow more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is needed for the best growth of newly established seedlings. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration. Regeneration cuts that preserve as many shade trees as possible reduce the rate of evapotranspiration and thus conserve soil moisture.

No major limitations affect the use of this soil as a site for buildings or local roads. Ground-water contamination is a hazard on sites for septic tank absorption fields because of the rapid or very rapid permeability. The soil readily absorbs but does not adequately filter the effluent.

The land capability classification is IIIs.

257E—Hinckley and Windsor soils, steep. These steep, very deep, excessively drained soils are in elongated or irregularly shaped, hilly areas. Slopes range from 15 to 45 percent. They are convex and typically are 50 to 100 feet long. Individual areas range from 5 to 50 acres in size. This unit is about 50 percent Hinckley soil, 40 percent Windsor soil, and 10 percent other soils. The proportion is different in each mapped area. The Hinckley and Windsor soils were mapped together because they have similar use and management requirements.

Typically, the surface layer of the Hinckley soil is black, friable very gravelly sandy loam about 8 inches thick. The subsoil is very friable very gravelly loamy sand about 8 inches thick. The upper 2 inches is dark reddish brown, and the lower 6 inches is reddish brown. The substratum to a depth of 65 inches or more is strong brown, loose sand and gravel.

Typically, the surface layer of the Windsor soil is dark brown, very friable loamy fine sand about 4 inches thick. The upper 10 inches of the subsoil is yellowish brown, very friable loamy sand. The lower 8 inches is light olive brown, loose loamy sand. The substratum to a depth of 65 inches or more is pale olive, loose sand.

Figure 11.—A stand of red pine in an area of Windsor loamy fine sand, 1 to 5 percent slopes.

Included with these soils in mapping are areas where most of the surface layer has been removed by erosion and small areas of the somewhat excessively drained Merrimac soils at the base of slopes. Merrimac soils are in most of the mapped areas. Included areas make up about 5 to 10 percent of the unit.

Permeability is rapid or very rapid in the subsoil of the Hinckley soil and very rapid in the substratum. It is rapid or very rapid in the subsoil and substratum of the Windsor soil. The available water capacity is very low in the Hinckley soil and low in the Windsor soil. The soils are droughty most of the time. The root zone is restricted by the loose sand and gravel. The soils range from extremely acid to moderately acid throughout.

Most areas are wooded. Because of droughtiness and the slope, these soils are generally not suited to cultivated crops and are poorly suited to hay and pasture.

The potential productivity for eastern white pine is high. The main management concerns are droughtiness and the hazard of erosion. Thinning crowded stands to standard stocking levels and removing diseased, deformed, or otherwise undesirable trees allow more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or

control of competing vegetation is needed for the best growth of newly established seedlings. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration. Regeneration cuts that preserve as many shade trees as possible reduce the rate of evapotranspiration and thus conserve soil moisture. Constructing access roads and trails with grades of 2 to 10 percent and installing water bars help to control erosion.

The main limitation affecting the use of these soils as sites for buildings is the slope. Extensive land shaping generally is needed. Designing buildings and lots so that they conform to the natural slope of the land can help to overcome the slope and control erosion in disturbed areas. Extensive cutting and filling generally are needed on sites for local roads. Constructing the roads on the contour and planting suitable grasses on roadbanks help to control erosion. The main limitations on sites for septic tank absorption fields are the slope and the very rapid permeability. Ground-water contamination is a hazard because the soils do not adequately filter the effluent. Installing the distribution lines across the slope can help to overcome the slope, but in some areas additional precautionary measures are needed if the effluent is to be adequately filtered. Where these soils are mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The land capability classification is VIIs.

260A—Sudbury fine sandy loam, 0 to 3 percent slopes. This nearly level, very deep, moderately well drained soil is on high stream terraces. Individual areas are irregularly shaped and range from 5 to 15 acres in size.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 7 inches thick. The subsoil is about 18 inches thick. The upper 8 inches is dark brown, friable gravelly fine sandy loam. The lower 10 inches is brown, mottled, very friable very gravelly fine sandy loam. The substratum to a depth of 65 inches or more is dark grayish brown, loose coarse sand and gravel.

Included with this soil in mapping are areas of the poorly drained Walpole and somewhat excessively drained Merrimac soils. Also included, at the edges of a few mapped areas, are soils that have slopes of more than 3 percent. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderately rapid in the subsoil of the Sudbury soil and rapid in the substratum. The available water capacity is moderate. The soil is droughty in late summer. The seasonal high water table is at a depth of about 20 inches in winter and early spring. Root growth is restricted by the loose coarse sand and gravel at a depth of about 25 inches and by the seasonal high water table. The soil is very strongly acid to slightly acid.

Most areas are used for row crops (fig. 12). A few areas are covered with brush and trees.

This soil is well suited to row crops and small grain. Wetness is the main limitation. It can delay planting and harvesting. Returning crop residue to the soil helps to increase or maintain the content of organic matter in the surface layer.

This soil is fairly well suited to hay and pasture. The main management concern is overgrazing, which causes surface compaction and reduces the hardiness and density of plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and prevent surface compaction.

The potential productivity for northern red oak is moderate. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is needed for the best growth of newly established seedlings. Pruning can improve the quality of white pine.

Buildings in areas of this soil should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Constructing on raised, coarse textured base material and providing adequate roadside ditches and culverts help to protect local roads from the damage caused by wetness and frost action. The seasonal high water table and a poor filtering capacity are the main limitations on sites for septic tank absorption fields. The poor filtering capacity can result in the pollution of ground water. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations. Where this soil is mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The land capability classification is IIw.

260B—Sudbury fine sandy loam, 3 to 8 percent slopes. This gently sloping, very deep, moderately well drained soil is on high stream terraces. Individual areas are irregularly shaped and range from 5 to 15 acres in size.

Figure 12.—Swiss chard in an area of Sudbury fine sandy loam, 0 to 3 percent slopes.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 7 inches thick. The subsoil is about 18 inches thick. The upper 8 inches is dark brown, friable gravelly fine sandy loam. The lower 10 inches is brown, mottled, very friable very gravelly fine sandy loam. The substratum to a depth of 65 inches or more is dark grayish brown, loose coarse sand and gravel.

Included with this soil in mapping are small areas of the poorly drained Walpole and somewhat excessively drained Merrimac soils. Also included, at the perimeter of a few mapped areas, are soils that have slopes of less than 3 percent or more than 8 percent. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderately rapid in the subsoil of the Sudbury soil and rapid in the substratum. The available water capacity is moderate. The soil is droughty in late summer. The seasonal high water table is at a depth of about 20 inches in winter and early spring. Root growth is restricted by the loose coarse sand and gravel at a depth of about 25 inches and by the seasonal high water table. The soil is very strongly acid to slightly acid.

Most areas are used for row crops. A few areas are covered with brush and trees.

This soil is well suited to row crops and small grain. Wetness is the main limitation. It can delay planting and harvesting. Returning crop residue to the soil helps to increase or maintain the content of organic matter in the surface layer.

This soil is well suited to hay and pasture. The main management concern is overgrazing, which causes surface compaction and reduces the hardiness and density of plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and prevent surface compaction.

The potential productivity for northern red oak is moderate. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is needed for the best growth of newly established seedlings. Pruning can improve the quality of white pine.

Buildings in areas of this soil should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Constructing on raised, coarse textured base material and providing adequate roadside ditches and culverts help to protect local roads from the damage caused by wetness and frost action. The seasonal high water table and a poor filtering capacity are the main limitations on sites for septic tank absorption fields. The poor filtering capacity can result in the pollution of ground water. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The land capability classification is IIe.

300B—Montauk fine sandy loam, 3 to 8 percent slopes. This gently sloping, very deep, well drained soil is on the top and sides of glacial till hills. Individual areas are rectangular or oval and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 7 inches thick. The subsoil is very friable fine sandy loam about 17 inches thick. It is dark yellowish brown in the upper 9 inches and olive brown in the lower 8 inches. The substratum to a depth of 65 inches or more is olive, very firm loamy sand.

Included with this soil in mapping are small areas of the well drained Paxton, moderately well drained Scituate, and poorly drained Ridgebury soils. Also included are some areas of soils that have slopes of less than 3 percent or more than 8 percent. Included areas make up about 10 to 15 percent of the unit.

Permeability is moderate or moderately rapid in the subsoil of the Montauk soil and moderately slow or slow in the substratum. A perched seasonal high water table is at a depth of about 2 feet for brief periods in winter and spring and after prolonged rains. The soil is extremely acid to moderately acid.

Many areas are farmed. Some areas are used as woodland. Some have been developed as homesites.

This soil is well suited to cultivated crops and to hay and pasture. Good tilth can be easily maintained in cultivated areas. Minimum tillage, contour farming, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and the hazard of erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the content of organic matter. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

This soil is well suited to trees. The potential productivity for northern red oak is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

The perched seasonal high water table is the main limitation affecting building site development. The slope is a limitation on sites for small commercial buildings, and the slow or moderately slow permeability is a limitation on sites for septic tank absorption fields.

The land capability classification is IIe.

305C—Paxton fine sandy loam, 8 to 15 percent slopes. This strongly sloping, very deep, well drained soil is on the crest and lower side slopes of drumloidal glacial till ridges. Individual areas are irregularly shaped and range from 5 to 25 acres in size.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 2 inches thick. The subsoil is friable fine sandy loam about 16 inches thick. It is dark yellow brown in the upper 3 inches and yellowish brown in the lower 13 inches. The substratum to a depth of 65 inches or more is brown, very firm fine sandy loam.

Included with this soil in mapping are small areas of the moderately well drained Woodbridge, poorly drained Ridgebury, and well drained Chatfield soils. Also included are small areas of soils that have slopes of less than 8 percent or more than 15 percent. Included

areas make up about 10 to 15 percent of the unit.

Permeability is moderate in the solum of the Paxton soil and slow or very slow in the substratum. The available water capacity is high. A perched seasonal high water table is at a depth of about 2 feet in early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the very firm substratum. The soil is very strongly acid to moderately acid.

Most areas have been cleared of surface stones and are used as cropland or hayland. Some areas have reverted to woodland. Some have been developed as homesites.

This soil is well suited to cultivated crops. The main management concerns are the slope and the hazard of erosion. Minimum tillage, contour farming, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and the hazard of erosion.

This soil is well suited to grasses and legumes for hay or pasture. The main management concern is overgrazing, which reduces the hardiness and density of plants. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for northern red oak is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

If this soil is used for building site development, designing the buildings so that they conform to the natural slope of the land can help to overcome the slope and reduce the hazard of erosion in disturbed areas. Land shaping is needed in some areas. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by low soil strength and frost action. Constructing the roads on the contour, if possible, and planting suitable grasses on roadbanks can reduce the hazard of erosion. Because of the restricted permeability, the soil does not readily absorb the effluent in septic tank absorption fields. Installing an absorption field that is larger than average helps to overcome this limitation.

The land capability classification is IIIe.

310B—Woodbridge fine sandy loam, 3 to 8 percent slopes. This gently sloping, very deep, moderately well drained soil is in low areas on glacial till uplands. Individual areas are irregularly shaped and range from 5 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 5 inches thick. The subsoil is friable fine sandy loam about 19 inches thick. The upper 8 inches is yellowish brown, and the lower 11 inches is brown and mottled. The substratum to a depth of 65 inches or more is gray, mottled, firm gravelly sandy loam.

Included with this soil in mapping are small areas of the well drained Paxton and poorly drained Ridgebury soils. These soils are in low, concave areas. Also included are soils that have slopes of less than 3 percent or more than 8 percent. Included areas make up 10 to 15 percent of the unit.

Permeability is moderate in the subsoil of the Woodbridge soil and slow or very slow in the substratum. The available water capacity is high. The seasonal high water table is at a depth of about 13 inches in winter and early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the firm substratum, and root growth is impeded by the seasonal high water table in early spring. The soil is very strongly acid to moderately acid.

Most areas have been cleared of surface stones and are used as cropland or hayland. Some areas have reverted to woodland.

This soil is well suited to cultivated crops. Good tilth can be easily maintained in cultivated areas. The hazard of erosion is the main management concern. The seasonal high water table in spring is a management concern, but a drainage system generally is needed only in troublesome wet spots. Stripcropping, minimum tillage, cover crops, and a cropping system that includes grasses and legumes help to control runoff and erosion. Mixing crop residue and animal manure into the plow layer helps to maintain good tilth and increases the content of organic matter.

This soil is well suited to hay and pasture. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for eastern white pine is high. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for

planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

Buildings in areas of this soil should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The land capability classification is IIe.

315B—Scituate fine sandy loam, 3 to 8 percent slopes. This gently sloping, very deep, moderately well drained soil formed in loamy glacial till on ridges and the lower parts of hills. Individual areas are rectangular or oval and range from 5 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 10 inches thick. The subsoil is about 13 inches thick. It is yellowish brown, friable gravelly fine sandy loam in the upper 9 inches and light olive brown, firm gravelly sandy loam in the lower 4 inches. The substratum to a depth of 65 inches or more is light brownish gray and olive gray, friable and firm gravelly sandy loam and loamy sand.

Included with this soil in mapping are small areas of the well drained Montauk, moderately well drained Woodbridge, and poorly drained Ridgebury soils. Also included are some areas of soils that have slopes of less than 3 percent or more than 8 percent. Included soils make up about 10 to 15 percent of the unit.

Permeability is moderately rapid in the subsoil of the Scituate soil and slow in the substratum. The available water capacity is moderate. A perched seasonal high water table is at a depth of about 2 feet in winter and spring and for short periods after prolonged rains. The rooting depth is restricted by the firm substratum. The soil is very strongly acid to moderately acid.

Many areas are farmed. Some areas are used as woodland. Some have been developed as homesites.

This soil is well suited to cultivated crops and to hay and pasture. Good tilth can be easily maintained in cultivated areas. Wetness is the main limitation, and a drainage system is the main management need. Minimum tillage, contour farming, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and the hazard of erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the content of organic matter. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

This soil is suited to trees. The potential productivity for eastern white pine is high. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

Buildings in areas of this soil should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The land capability classification is IIw.

355B—Marlow loam, 3 to 8 percent slopes. This gently sloping, very deep, well drained soil is on the crest and lower side slopes of drumlins and glacial till ridges. Individual areas are irregularly shaped and range from 5 to 25 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 2 inches thick. The subsoil is about 22 inches thick. In sequence downward, it is 4 inches of dark brown, friable loam; 8 inches of yellowish red, friable loam; and 10 inches of light olive brown, friable fine sandy loam. The substratum to a depth of 65 inches or more is firm gravelly fine sandy loam. It is olive in the upper part and dark grayish brown in the lower part.

Included with this soil in mapping are small areas of the well drained Shelburne, moderately well drained Peru and Ashfield, and somewhat poorly drained Pillsbury soils. Also included are small areas of soils that have slopes of less than 3 percent or more than 8

percent. Included areas make up about 10 to 15 percent of the unit.

Permeability is moderate in the subsoil of the Marlow soil and moderately slow or slow in the substratum. The available water capacity is high. A perched seasonal high water table is at a depth of about 2 feet in early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the firm substratum. The soil is very strongly acid to moderately acid.

Most areas have been cleared of surface stones and are used as cropland or hayland. Some areas have reverted to woodland. Some have been developed as homesites.

This soil is well suited to cultivated crops. In cultivated areas a cropping system that keeps erosion within tolerable limits is needed. Minimum tillage, contour farming, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and the hazard of erosion.

This soil is well suited to grasses and legumes for hay or pasture. The main management concern is overgrazing, which reduces the hardiness and density of plants. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for northern red oak is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

The perched seasonal high water table is the main limitation affecting building site development. Buildings should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The land capability classification is IIe.

355C—Marlow loam, 8 to 15 percent slopes. This strongly sloping, very deep, well drained soil is on the crest and side slopes of drumloidal glacial till ridges. Individual areas are irregularly shaped and range from 10 to 15 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 2 inches thick. The subsoil is about 22 inches thick. In sequence downward, it is 4 inches of dark brown, friable loam; 8 inches of yellowish red, friable loam; and 10 inches of light olive brown, friable fine sandy loam. The substratum to a depth of 65 inches or more is firm gravelly fine sandy loam. It is olive in the upper part and dark grayish brown in the lower part.

Included with this soil in mapping are small areas of the well drained Shelburne, moderately well drained Peru and Ashfield, and somewhat poorly drained Pillsbury soils. Also included are some areas of soils that have slopes of less than 8 percent or more than 15 percent. Included areas make up about 10 to 15 percent of the unit.

Permeability is moderate in the solum of the Marlow soil and moderately slow or slow in the substratum. The available water capacity is high. A perched seasonal high water table is at a depth of about 2 feet in early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the firm substratum. The soil is very strongly acid to moderately acid.

Most areas have been cleared of surface stones and are used for cultivated crops, hay, or pasture. Some areas have reverted to woodland. Some have been developed as homesites.

This soil is well suited to cultivated crops. The main management concerns are the slope and the hazard of erosion. Minimum tillage, contour farming, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and the hazard of erosion.

This soil is well suited to grasses and legumes for hay or pasture. The main management concern is overgrazing, which reduces the hardiness and density of plants. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for northern red oak is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing

vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

If this soil is used for building site development, designing the buildings so that they conform to the natural slope of the land can help to overcome the slope and reduce the hazard of erosion in disturbed areas. Land shaping is needed in some areas. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by low soil strength and frost action. Constructing the roads on the contour, if possible, and planting suitable grasses on roadbanks can reduce the hazard of erosion. Because of the restricted permeability, the soil cannot readily absorb the effluent in septic tank absorption fields. Installing an absorption field that is larger than average helps to overcome this limitation.

The land capability classification is IIIe.

360A—Peru loam, 0 to 3 percent slopes. This nearly level, very deep, moderately well drained soil is in low areas on glacial till uplands. Individual areas are irregularly shaped and range from 5 to 25 acres in size.

Typically, the surface layer is dark brown, friable loam about 3 inches thick. The subsoil is about 14 inches thick. The upper 8 inches is dark brown, mottled, friable loam, and the lower 6 inches is brown, mottled, friable fine sandy loam. The substratum to a depth of 65 inches or more is grayish brown, mottled, very firm gravelly fine sandy loam.

Included with this soil in mapping are small areas of the well drained Marlow soils. Also included are the poorly drained Pillsbury soils in low, concave areas and soils that have slopes of more than 3 percent. Included areas make up 10 to 15 percent of the unit.

Permeability is moderate in the subsoil of the Peru soil and moderately slow or slow in the substratum. The available water capacity is moderate. The seasonal high water table is at a depth of about 20 to 24 inches in winter and early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the very firm substratum, and root growth is impeded by the seasonal high water table in early spring. The soil is very strongly acid to moderately acid.

Most areas have been cleared of surface stones and are used as cropland (fig. 13) or hayland. Some areas have reverted to woodland.

This soil is well suited to cultivated crops. Good tilth can be easily maintained in cultivated areas. The seasonal high water table in spring is the main management concern, but a drainage system generally is needed only in troublesome wet spots. Stripcropping, minimum tillage, cover crops, and a cropping system that includes grasses and legumes help to control runoff and erosion. Mixing crop residue and animal manure into the plow layer helps to maintain good tilth and increases the content of organic matter.

This soil is well suited to hay and pasture. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for sugar maple is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

Buildings in areas of this soil should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The land capability classification is IIw.

360B—Peru loam, 3 to 8 percent slopes. This gently sloping, very deep, moderately well drained soil is in low areas on glacial till uplands. Individual areas are irregularly shaped and range from 5 to 25 acres in size.

Typically, the surface layer is dark brown, friable loam about 3 inches thick. The subsoil is about 14 inches thick. The upper 8 inches is dark brown, mottled, friable loam, and the lower 6 inches is brown, mottled, friable fine sandy loam. The substratum to a depth of 65 inches or more is grayish brown, mottled, very firm gravelly fine sandy loam.

Included with this soil in mapping are small areas of the well drained Marlow soils. Also included are the poorly drained Pillsbury soils in low, concave areas and

Figure 13.—Picking potatoes in an area of Peru loam, 0 to 3 percent slopes.

soils that have slopes of less than 3 percent or more than 8 percent. Included areas make up about 10 to 15 percent of the unit.

Permeability is moderate in the subsoil of the Peru soil and moderately slow or slow in the substratum. The available water capacity is moderate. The seasonal high water table is at a depth of about 20 to 24 inches in winter and early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the very firm substratum, and root growth is impeded by the seasonal high water table in early spring. The soil is very strongly acid to moderately acid.

Most areas have been cleared of surface stones and are used as cropland or hayland. Some areas have reverted to woodland.

This soil is well suited to cultivated crops. Good tilth can be easily maintained in cultivated areas. The hazard of erosion is the main management concern. The seasonal high water table in spring is a management concern, but a drainage system generally is needed only in troublesome wet spots. Stripcropping, minimum tillage, cover crops, and a cropping system that includes grasses and legumes help to control runoff and erosion. Mixing crop residue and animal manure

into the plow layer helps to maintain good tilth and increases the content of organic matter.

This soil is well suited to hay and pasture. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for sugar maple is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

Buildings in areas of this soil should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The land capability classification is IIe.

360C—Peru loam, 8 to 15 percent slopes. This strongly sloping, very deep, moderately well drained soil is on the sides of glacial till ridges. Individual areas are irregularly shaped and range from 5 to 25 acres in size.

Typically, the surface layer is dark brown, friable loam about 3 inches thick. The subsoil is about 14 inches thick. The upper 8 inches is dark brown, mottled, friable loam, and the lower 6 inches is brown, mottled, friable fine sandy loam. The substratum to a depth of 65 inches or more is grayish brown, mottled, very firm gravelly fine sandy loam.

Included with this soil in mapping are small areas of the well drained Marlow soils. Also included are the poorly drained Pillsbury soils in low, concave areas and soils that have slopes of less than 8 percent or more than 15 percent. Included areas make up about 10 to 15 percent of the unit.

Permeability is moderate in the subsoil of the Peru soil and moderately slow or slow in the substratum. The available water capacity is moderate. The seasonal high water table is at a depth of about 20 to 24 inches in winter and early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the very firm substratum, and root growth is impeded by the seasonal high water table in early spring. The soil is very strongly acid to moderately acid.

Most areas have been cleared of stones and are used as cropland or hayland. Some areas have reverted to woodland.

This soil is fairly well suited to cultivated crops. The hazard of erosion is the main management concern. Good tilth can be easily maintained in cultivated areas. The seasonal high table in spring is a management concern, but a drainage system generally is needed only in troublesome wet spots. Stripcropping, minimum tillage, cover crops, and a cropping system that includes grasses and legumes help to control runoff and erosion. Mixing crop residue and animal manure into the plow layer helps to maintain good tilth and increases the content of organic matter.

This soil is well suited to hay and pasture. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for sugar maple is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

If this soil is used as a site for buildings, constructing the lower or basement level above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Land shaping is needed in some areas. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The land capability classification is IIIe.

370B—Shelburne loam, 3 to 8 percent slopes. This gently sloping, very deep, well drained soil is on the crest and lower side slopes of drumloidal glacial till ridges. Individual areas are irregularly shaped and range from 5 to 25 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 6 inches thick. The subsoil is friable fine sandy loam about 13 inches thick. It is dark yellowish brown in the upper 3 inches, olive brown in the next 5 inches, and dark grayish brown in the lower 5 inches. The substratum to a depth of 65 inches or more is olive, firm fine sandy loam.

Included with this soil in mapping are small areas of the moderately well drained Ashfield and poorly drained Pillsbury soils. Also included small areas of soils that have slopes of less than 3 percent or more than 8 percent. Included areas make up about 10 to 15 percent of the unit.

Permeability is moderate or moderately rapid in the solum of the Shelburne soil and slow in the substratum. The available water capacity is low. A perched seasonal high water table is above the dense substratum for brief periods in late winter and early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the firm substratum. The soil is very strongly acid to moderately acid.

Most areas have been cleared of surface stones and are used as cropland or hayland. Some areas have reverted to woodland. Some have been developed as homesites.

This soil is well suited to cultivated crops. In cultivated areas a cropping system that keeps erosion within tolerable limits is needed. Minimum tillage, contour farming, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and the hazard of erosion.

This soil is well suited to grasses and legumes for hay or pasture. The main management concern is overgrazing, which reduces the hardiness and density of plants. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for red pine is high. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

No major limitations affect building site development on this soil. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by low soil strength and frost action. Because of the restricted permeability, the soil cannot readily absorb the effluent in septic tank absorption fields. Installing an absorption field that is larger than average helps to overcome this limitation.

The land capability classification is IIe.

370C—Shelburne loam, 8 to 15 percent slopes. This strongly sloping, very deep, well drained soil is on the crest and side slopes of drumloidal glacial till ridges. Individual areas are irregularly shaped and range from 10 to 15 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 6 inches thick. The subsoil is friable fine sandy loam about 13 inches thick. It is dark yellowish brown in the upper 3 inches, olive brown in the next 5 inches, and dark grayish brown in the lower 5 inches. The substratum to a depth of 65 inches or more is olive, firm fine sandy loam.

Included with this soil in mapping are small areas of the moderately well drained Ashfield and poorly drained Pillsbury soils. Also included are some areas of soils that have slopes of less than 8 percent or more than 15 percent. Included areas make up about 10 to 15 percent of the unit.

Permeability is moderate or moderately rapid in the solum of the Shelburne soil and slow in the substratum. The available water capacity is low. A perched seasonal high water table is above the dense substratum for brief periods in late winter and early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the firm substratum. The soil is very strongly acid to moderately acid.

Most areas have been cleared of surface stones and are used for cultivated crops, hay, or pasture. Some areas have reverted to woodland. Some have been developed as homesites.

This soil is well suited to cultivated crops. The main management concerns are the slope and the hazard of erosion. Minimum tillage, contour farming, cover crops, and a cropping system that includes grasses and legumes reduce the runoff rate and the hazard of erosion.

This soil is well suited to grasses and legumes for hay or pasture. The main management concern is overgrazing, which reduces the hardiness and density of plants. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for northern red oak is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

If this soil is used for building site development, designing the buildings so that they conform to the natural slope of the land can help to overcome the slope and reduce the hazard of erosion in disturbed areas. Land shaping is needed in some areas. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by low soil strength and frost action. Constructing the roads on the contour, if possible, and planting suitable grasses on roadbanks can reduce the hazard of erosion. Because of the restricted permeability, the soil cannot readily absorb the effluent in septic tank absorption fields. Installing an absorption field that is larger than average helps to overcome this limitation.

The land capability classification is IIIe.

375B—Ashfield fine sandy loam, 3 to 8 percent slopes. This gently sloping, very deep, moderately well drained soil is in low areas on glacial till uplands. Individual areas are irregularly shaped and range from 5 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 3 inches thick. The subsoil is fine sandy loam about 19 inches thick. The upper 12 inches is dark yellowish brown and friable, and the lower 7 inches is yellowish brown, mottled, and firm. The substratum to a depth of 65 inches or more is olive gray, mottled, very firm sandy loam. As mapped in this survey area, this soil is outside the range of characteristics for the official series because of a low percentage of exchangeable bases.

Included with this soil in mapping are areas of the well drained Shelburne and poorly drained Pillsbury soils. These areas generally less than 3 acres in size. Pillsbury soils are in low, concave areas. Also included are soils that have slopes of less than 3 percent or more than 8 percent. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderate or moderately rapid in the solum of the Ashfield soil and slow in the substratum. The available water capacity is high. The seasonal high water table is at a depth of about 17 inches in winter and early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the very firm substratum, and root growth is impeded by the seasonal high water table in early spring. The soil is strongly acid to slightly acid in the solum and moderately acid to neutral in the substratum.

Most areas have been cleared of surface stones and are used as cropland or hayland. Some areas have reverted to woodland.

This soil is well suited to cultivated crops. Good tilth can be easily maintained in cultivated areas. The seasonal high water table in spring is the main management concern, but a drainage system generally is needed only in troublesome wet spots. Stripcropping, minimum tillage, cover crops, and a cropping system that includes grasses and legumes help to control runoff and erosion. Mixing crop residue and animal manure into the plow layer helps to maintain good tilth and increases the content of organic matter.

This soil is well suited to hay and pasture. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for sugar maple is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

Buildings in areas of this soil should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The land capability classification is IIw.

375C—Ashfield fine sandy loam, 8 to 15 percent slopes. This strongly sloping, very deep, moderately well drained soil is on the sides of glacial till ridges. Individual areas are irregularly shaped and range from 5 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 3 inches thick. The subsoil is fine sandy loam about 19 inches thick. The upper 12 inches is dark yellowish brown and friable, and the lower 7 inches is yellowish brown, mottled, and firm. The substratum to a depth of 65 inches or more is olive gray, mottled, very firm sandy loam. As mapped in this survey area, this soil is outside the range of characteristics for the official series because of a low percentage of exchangeable bases.

Included with this soil in mapping are small areas of the well drained Shelburne and poorly drained Pillsbury soils. These areas generally are less than 3 acres in size. Pillsbury soils are in low, concave areas. Also included are soils that have slopes of less than 8 percent or more than 15 percent. Included areas make up about 5 to 10 percent of the unit.

Permeability is moderate or moderately rapid in the solum of the Ashfield soil and slow in the substratum. The available water capacity is high. The seasonal high water table is at a depth of about 17 inches in winter and early spring. The depth to bedrock is more than 5 feet. The rooting depth is restricted by the very firm substratum, and root growth is impeded by the seasonal high water table in early spring. The soil is strongly acid to slightly acid in the solum and moderately acid to neutral in the substratum.

Most areas have been cleared of stones and are used as cropland or hayland. Some areas have reverted to woodland.

This soil is fairly well suited to cultivated crops. The hazard of erosion is the main management concern. Good tilth can be easily maintained in cultivated areas. The seasonal high water table in spring is the main management concern, but a drainage system generally is needed only in troublesome wet spots. Stripcropping, minimum tillage, cover crops, and a cropping system that includes grasses and legumes help to control runoff and erosion. Mixing crop residue and animal manure into the plow layer helps to maintain good tilth and increases the content of organic matter.

This soil is well suited to hay and pasture. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity for sugar maple is moderate. The productivity of the soil justifies intensive management for either hardwoods or conifers. No major limitations affect woodland management. Plant competition is moderate during regeneration if conifers are grown. Thinning crowded stands to standard stocking levels allows more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing vegetation is necessary for the best growth of newly established seedlings. Pruning improves the quality of white pine.

Buildings in areas of this soil should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Land shaping is needed in some areas. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The land capability classification is IIIe.

600—Pits, gravel. This map unit consists of excavations that are primarily in areas of gravelly and sandy glacial outwash but also are in areas of loose, sandy glacial till. The excavations were made when gravel was removed for construction purposes. They are 3 to 50 feet deep and range from 2 to more than 100 acres in size. They commonly are irregularly shaped, depending on the nature of the deposits and ownership boundaries. The sides generally are steep, and the floor is relatively level. Scattered piles of stones and boulders are common on the floor. Included in mapping are small pools of water in some of the pits.

The pits generally have no vegetation, although some of the older ones have scattered bushes, grasses, and annuals. The pits are droughty because of a very low available water capacity. Permeability varies. It generally is moderately rapid to very rapid.

The potential of the pits for urban and recreational uses ranges from good to poor. Onsite investigation is needed to ascertain the potential of a particular area. The potential for sanitary waste disposal facilities is poor because of a hazard of ground-water pollution.

The potential for farming and woodland is poor because of the very low available water capacity. In general, the potential for wildlife habitat is poor, although some birds prefer to nest in areas of this unit.

No land capability classification is assigned.

903C—Chatfield-Hollis association, rolling, extremely stony. These soils are on the sides and top of hills and mountains. The moderately deep, well drained Chatfield soil typically is on the flatter parts of slopes between areas of rock outcrops. The shallow, somewhat excessively drained Hollis soil is on the upper parts of slopes and in convex areas. Slopes range from 3 to 15 percent. Stones, boulders, and rock outcrops cover approximately 3 to 15 percent of the surface. Individual areas are irregularly shaped and range from 30 to 500 acres in size. This unit is about 59 percent Chatfield soil, 33 percent Hollis soil, and 8 percent other soils and rock outcrops.

Typically, the surface layer of the Chatfield soil is very dark grayish brown, very friable fine sandy loam about 4 inches thick. The subsoil is about 16 inches thick. The upper 8 inches is dark yellowish brown, very friable gravelly fine sandy loam. The lower 8 inches is olive brown, very friable gravelly sandy loam. The substratum is olive brown, friable gravelly sandy loam about 7 inches thick. The underlying bedrock typically is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Hollis soil is very dark grayish brown, very friable loam about 2 inches thick. The subsoil is very friable fine sandy loam about 14 inches thick. The upper 4 inches is dark brown, and the lower 10 inches is dark yellowish brown. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Included with these soils in mapping are areas of rock outcrop and the very deep Charlton soils on the steeper hillsides and mountain slopes and poorly drained and very poorly drained soils in some depressions and nearly level areas. Also included are soils that have slopes of more than 15 percent. Included areas make up about 10 to 15 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the Chatfield soil and moderate or moderately rapid in the Hollis soil. The available water capacity is moderate in the Chatfield soil and very low in the Hollis soil. Bedrock is at a depth of 20 to 40 inches in the Chatfield soil and within a depth of 20 inches in the Hollis soil. The rooting depth is limited by the shallowness to bedrock. Reaction is very strongly acid or strongly acid in the Chatfield soil and very strongly acid to moderately acid in the Hollis soil.

Most areas are used as woodland. Because of the surface stones and the exposed bedrock, these soils are poorly suited to cultivated crops and to hay and pasture.

The potential productivity for northern red oak is low. Windthrow is a moderate hazard because of the shallowness to bedrock. Generally, the soils are droughty. In some years seedling mortality is severe. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and conserve soil moisture. Thinning generally should be avoided because of the hazard of windthrow. Removing and controlling competing understory vegetation can increase the growth and survival rates of newly planted trees.

Excavating during building site development may be difficult because of the underlying bedrock. In most areas the bedrock is very hard or cemented. It can hinder road construction. Large machinery is generally required for excavations. The shallowness to bedrock is the main limitation on sites for septic tank absorption fields. The bedrock can hinder the installation of distribution lines. Where these soils are mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The included soils may be better suited to intended land uses than the Chatfield and Hollis soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

904C—Lyman-Tunbridge association, rolling, extremely stony. These soils are on the sides and top of hills and mountains. The shallow, somewhat excessively drained Lyman soil is on the upper parts of slopes and in convex areas. The moderately deep, well drained Tunbridge soil typically is on the flatter parts of slopes between areas of rock outcrops. Slopes range from 3 to 15 percent. Stones, boulders, and rock outcrops cover approximately 3 to 15 percent of the surface. Individual areas are irregularly shaped and range from 30 to 500 acres in size. This unit is about 55 percent Lyman soil, 30 percent Tunbridge soil, and 15 percent other soils and rock outcrops.

Typically, the surface layer of the Lyman soil is black, friable loam about 1 inch thick. The subsoil is about 16 inches thick. The upper part is 2 inches of gray fine sandy loam over 6 inches of dark reddish brown to dark brown, friable loam and fine sandy loam. The lower 8 inches is dark yellowish brown to brown, friable fine sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Tunbridge soil is black, friable loam about 3 inches thick. The subsoil is about 18 inches thick. The upper part is 3 inches of light gray fine sandy loam over 5 inches of reddish brown to strong brown, friable loam. The lower 10 inches is dark brown, friable loam. The underlying

Figura 14.—A wooded area of Lyman-Tunbridge association, rolling, extremely stony.

bedrock typically is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Included with these soils in mapping are areas of rock outcrop, the very deep Marlow soils, and soils that have slopes of more than 15 percent. Also included, in some depressions and nearly level areas, are soils that are more poorly drained than the Lyman and Tunbridge soils. Included areas make up about 15 percent of the unit and are as much as 20 acres in size.

Permeability is moderately rapid in the Lyman soil and moderate or moderately rapid in the Tunbridge soil. The available water capacity is low in the Lyman soil and moderate in the Tunbridge soil. Bedrock is within a depth of 20 inches in the Lyman soil and at a depth of 20 to 40 inches in the Tunbridge soil. The rooting depth is limited by the shallowness to bedrock. The soils are very strongly acid or strongly acid.

Most areas are used as woodland (fig. 14). Because of the surface stones and the exposed bedrock, these soils are poorly suited to cultivated crops and to hay and pasture.

The potential productivity for sugar maple is moderate. Windthrow is a moderate hazard because of the shallowness to bedrock. Generally, the soils are droughty. In some years seedling mortality is severe. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and conserve soil moisture. Thinning generally should be avoided because of the hazard of windthrow. Removing and controlling competing understory vegetation can increase the growth and survival rates of newly planted trees.

Excavating during building site development may be difficult because of the underlying bedrock. In most

areas the bedrock is very hard or cemented. It can hinder road construction. Large machinery is generally required for excavations. The shallowness to bedrock is the main limitation on sites for septic tank absorption fields. The bedrock can hinder the installation of distribution lines.

The included soils may be better suited to intended land uses than the Lyman and Tunbridge soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

905C—Peru-Marlow association, rolling, extremely stony. These very deep soils are on the sides and crest of glacial uplands. The moderately well drained Peru soil typically is on the lower parts of slopes and in slightly concave areas. The well drained Marlow soil is on the upper parts of slopes and in convex areas. Slopes range from 3 to 15 percent. Stones and boulders cover approximately 3 to 15 percent of the surface. Individual areas are irregularly shaped and range from 30 to 300 acres in size. This unit is about 60 percent Peru soil, 20 percent Marlow soil, and 20 percent other soils.

Typically, the surface layer of the Peru soil is dark brown, friable loam about 3 inches thick. The subsoil is about 14 inches thick. It is dark brown, mottled, friable loam in the upper 8 inches and brown, mottled, friable fine sandy loam in the lower 6 inches. The substratum to a depth of 65 inches or more is grayish brown, mottled, very firm gravelly fine sandy loam.

Typically, the surface layer of the Marlow soil is very dark grayish brown, friable loam about 2 inches thick. The subsoil is about 22 inches thick. In sequence downward, it is 4 inches of dark brown, friable loam; 8 inches of yellowish red, friable loam; and 10 inches of light olive brown, friable fine sandy loam. The substratum to a depth of 65 inches or more is firm gravelly fine sandy loam. It is olive in the upper part and dark grayish brown in the lower part.

Included with these soils in mapping are the poorly drained, extremely stony Pillsbury soils on nearly level slopes and in depressions and the shallow Lyman and moderately deep Tunbridge soils on hillsides. Also included are small areas of soils that have slopes of more than 15 percent. Included areas make up about 20 percent of the unit and are as much as 20 acres in size.

Permeability is moderate in the solum of the Peru and Marlow soils and moderately slow or slow in the substratum. The available water capacity is moderate in the Peru soil and high in the Marlow soil. The seasonal high water table is perched above the substratum in these soils for brief periods during winter and spring and after prolonged rains. The root zone is restricted by the firm or very firm substratum. The soils are very strongly acid to moderately acid.

Most areas are used as woodland. The potential productivity is moderate for sugar maple on the Peru soil and for northern red oak on the Marlow soil. The main management concerns are the large surface stones and boulders and plant competition. The stones and boulders impede the use of harvesting and planting equipment. In some areas hand planting is needed. Thinning crowded stands to standard stocking levels and removing diseased, deformed, or otherwise undesirable trees allow more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing understory vegetation is needed for the best growth of newly established seedlings.

If these soils are used as sites for buildings, constructing the lower or basement level above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Land shaping is needed in some areas. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The included soils may be better suited to intended land uses than the Peru and Marlow soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

909E—Tunbridge-Lyman association, steep, extremely stony. These soils formed in extremely stony glacial till on mountainous uplands. The moderately deep, well drained Tunbridge soil typically is on the less sloping parts of the landscape and in pockets between areas of the Lyman soil and areas of bedrock outcrops. The shallow, somewhat excessively drained Lyman soil typically is on the upper steep slopes. Slopes range from 15 to 45 percent. Bedrock outcrops, stones, and boulders cover approximately 3 to 15 percent of the surface. Individual areas are irregularly shaped and range from 50 to 350 acres in size. This unit is about 50 percent Tunbridge soil, 20 percent Lyman soil, and 30 percent other soils.

Typically, the surface layer of the Tunbridge soil is black, friable loam about 3 inches thick. The subsoil is

about 18 inches thick. The upper part is 3 inches of light gray fine sandy loam over 5 inches of reddish brown to strong brown, friable loam. The lower 10 inches is dark brown, friable loam. The underlying bedrock typically is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Lyman soil is black, friable loam about 1 inch thick. The subsoil is about 16 inches thick. The upper part is 2 inches of gray fine sandy loam over 6 inches of dark reddish brown to dark brown, friable loam and fine sandy loam. The lower 8 inches is dark yellowish brown to brown, friable fine sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Included with these soils in mapping are areas of rock outcrop and the very deep Berkshire and Marlow soils on steep hillsides and mountain slopes. Also included are small areas of soils that have slopes of less than 15 percent. Included areas make up about 30 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the Tunbridge soil and moderately rapid in the Lyman soil. The available water capacity is moderate in the Tunbridge soil and low in the Lyman soil. Bedrock is at a depth of 20 to 40 inches in the Tunbridge soil and within a depth of 20 inches in the Lyman soil. The rooting depth is limited by the shallowness to bedrock. The soils are very strongly acid or strongly acid.

Most areas are used as woodland. Because of the slope, the shallowness to bedrock, and the exposed bedrock, these soils are generally unsuited to cultivated crops and to hay and pasture.

The potential productivity for sugar maple is moderate. The main management concerns are the shallowness to bedrock, the limited available water capacity, and the slope. Growth and survival rates are poor. The use of equipment is limited because of the rock outcrop and the slope. Thinning generally should be avoided because of a moderate hazard of windthrow. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and help to control runoff and erosion. Onsite investigation is needed to identify areas where tree planting is practical if special management is applied.

The slope and the shallowness to bedrock are the main limitations affecting building site development. Extensive land shaping and blasting of bedrock generally are necessary. Constructing local roads on the contour, if possible, and planting suitable grasses on roadbanks can reduce the hazard of erosion. The underlying bedrock hinders road construction in some areas. The underlying bedrock and the slope are the main limitations on sites for septic tank absorption fields. The distribution lines should be installed across the slope.

The included soils may be better suited to intended land uses than the Tunbridge and Lyman soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

910C—Woodbridge-Paxton association, rolling, extremely stony. These very deep soils are on the sides and crest of glacial uplands. The moderately well drained Woodbridge soil typically is on the lower parts of slopes and in slightly concave areas. The well drained Paxton soil is on the upper parts of slopes and in convex areas. Slopes range from 3 to 15 percent. Stones and boulders cover approximately 3 to 15 percent of the surface. Individual areas are irregularly shaped and range from 10 to 300 acres in size. This unit is about 50 percent Woodbridge soil, 40 percent Paxton soil, and 10 percent other soils.

Typically, the surface layer of the Woodbridge soil is very dark grayish brown, friable fine sandy loam about 5 inches thick. The subsoil is friable fine sandy loam about 19 inches thick. It is yellowish brown in the upper 8 inches and brown and mottled in the lower 11 inches. The substratum to a depth of 65 inches or more is gray, mottled, firm gravelly sandy loam.

Typically, the surface layer of the Paxton soil is very dark grayish brown, very friable fine sandy loam about 2 inches thick. The subsoil is friable fine sandy loam about 16 inches thick. It is dark yellowish brown in the upper 3 inches and yellowish brown in the lower 13 inches. The substratum to a depth of 65 inches or more is olive, very firm fine sandy loam.

Included with these soils in mapping are the poorly drained Ridgebury soils on nearly level slopes and in depressions and the shallow Hollis and moderately deep Chatfield soils on hillsides. Also included are soils that have slopes of more than 15 percent. Included areas make up about 10 percent of the unit and are as much as 20 acres in size.

Permeability is moderate in the solum of the Woodbridge and Paxton soils and slow or very slow in the substratum. The available water capacity is high in both soils. The seasonal high water table is perched above the substratum in these soils for brief periods during winter and spring and after prolonged rains. The root zone is restricted by the firm or very firm substratum. The soils are very strongly acid to moderately acid.

Most areas are used as woodland. Some areas have been cleared of trees and are used for cultivated crops, hay, or pasture.

The potential productivity is high for eastern white pine on the Woodbridge soil and moderate for northern red oak on the Paxton soil. The main management concerns are the large surface stones and boulders and plant competition. The stones and boulders impede the use of harvesting and planting equipment. In some areas hand planting is needed. Thinning crowded stands to standard stocking levels and removing diseased, deformed, or otherwise undesirable trees allow more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing understory vegetation is needed for the best growth of newly established seedlings.

If these soils are used as sites for buildings, constructing the lower or basement level above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Land shaping is needed in some areas. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations. Where these soils are mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The included soils may be better suited to intended land uses than the Woodbridge and Paxton soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

911C—Ashfield-Shelburne association, rolling, extremely stony. These soils are on the sides and crest of glacial uplands. The very deep, moderately well drained Ashfield soil typically is on the lower parts of slopes and in slightly concave areas. The very deep, well drained Shelburne soil is on the upper parts of slopes and in convex areas. Slopes range from 3 to 15 percent. Stones and boulders cover approximately 3 to 15 percent of the surface. Individual areas are irregularly shaped and range from 30 to 300 acres in size. This unit is about 75 percent Ashfield soil, 10 percent Shelburne soil, and 15 percent other soils.

Typically, the surface layer of the Ashfield soil is very dark grayish brown, very friable fine sandy loam about 3 inches thick. The subsoil is fine sandy loam about 19 inches thick. It is dark yellowish brown and friable in the upper 12 inches and yellowish brown, mottled, and firm in the lower 7 inches. The substratum to a depth of 65 inches or more is olive gray, mottled, very firm sandy loam.

Typically, the surface layer of the Shelburne soil is very dark grayish brown, friable fine sandy loam about 6 inches thick. The subsoil is friable fine sandy loam about 13 inches thick. It is dark yellowish brown in the upper 3 inches, olive brown in the next 5 inches, and dark grayish brown in the lower 5 inches. The substratum to a depth of 65 inches or more is olive, firm fine sandy loam.

Included with these soils in mapping are the poorly drained Pillsbury and very poorly drained Peacham soils on nearly level slopes and in depressions and the shallow Westminster and moderately deep Millsite soils and rock outcrop on hillsides. Also included are soils that have slopes of more than 15 percent. Included areas make up about 15 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the solum of the Ashfield and Shelburne soils and slow in the substratum. The available water capacity is high in the Ashfield soil and low in the Shelburne soil. The seasonal high water table is perched above the substratum in these soils for brief periods during winter and spring and after prolonged rains. The root zone is restricted by the firm or very firm substratum. The Ashfield soil is very strongly acid or strongly acid in the solum and strongly acid to slightly acid in the substratum. The Shelburne soil is very strongly acid to moderately acid.

Most areas are used as woodland. The potential productivity is moderate for sugar maple on the Ashfield soil and for northern red oak on the Shelburne soil. The main management concerns are the large surface stones and boulders and plant competition. The stones and boulders impede the use of harvesting and planting equipment. In some areas hand planting is needed. Thinning crowded stands to standard stocking levels and removing diseased, deformed, or otherwise undesirable trees allow more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing understory vegetation is needed for the best growth of newly established seedlings.

If these soils are used as sites for buildings, constructing the lower or basement level above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water

away from the buildings. Land shaping is needed in some areas. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The included soils may be better suited to intended land uses than the Ashfield and Shelburne soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

912E—Hollis-Chatfield association, steep, extremely stony. These soils formed in extremely stony glacial till on mountainous uplands. The shallow, somewhat excessively drained Hollis soil typically is on the upper steep slopes. The moderately deep, well drained Chatfield soil typically is on less sloping parts of the landscape and in pockets between areas of the Hollis soil and areas of bedrock outcrops. Slopes range from 15 to 45 percent. Bedrock outcrops, stones, and boulders cover approximately 3 to 15 percent of the surface. Individual areas are irregularly shaped and range from 50 to 350 acres in size. This unit is about 40 percent Hollis soil, 40 percent Chatfield soil, and 20 percent other soils.

Typically, the surface layer of the Hollis soil is very dark grayish brown, very friable loam about 2 inches thick. The subsoil is very friable fine sandy loam about 14 inches thick. The upper 4 inches is dark brown, and the lower 10 inches is dark yellowish brown. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Chatfield soil is very dark grayish brown, very friable fine sandy loam about 4 inches thick. The subsoil is about 16 inches thick. The upper 8 inches is dark yellowish brown, very friable gravelly fine sandy loam. The lower 8 inches is olive brown, very friable gravelly sandy loam. The substratum is olive brown, friable gravelly sandy loam about 7 inches thick. The underlying bedrock typically is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Included with these soils in mapping are areas of rock outcrop and the very deep Charlton, Paxton, and Montauk soils on steep hillsides and mountain slopes. Included areas make up about 20 percent of the unit and are as much as 20 acres in size.

Permeability is moderately rapid in the Hollis soil and moderate or moderately rapid in the Chatfield soil. The available water capacity is very low in the Hollis soil and moderate in the Chatfield soil. Bedrock is within a depth of 20 inches in the Hollis soil and at a depth of 20 to 40 inches in the Chatfield soil. The rooting depth is limited by the shallowness to bedrock. The Hollis soil is very strongly acid to moderately acid. The Chatfield soil is very strongly acid or strongly acid.

Most areas are used as woodland. Because of the slope, the shallowness to bedrock, and the exposed bedrock, these soils are generally unsuited to cultivated crops and to hay and pasture.

The potential productivity for northern red oak is low. The main management concerns are the shallowness to bedrock, the limited available water capacity, and the slope. Growth and survival rates are poor. The use of equipment is limited because of the rock outcrop and the slope. Thinning generally should be avoided because of a moderate hazard of windthrow. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and help to control runoff and erosion. Onsite investigation is needed to identify areas where tree planting is practical if special management is applied.

The slope and the shallowness to bedrock are the main limitations affecting building site development. Extensive land shaping and blasting of bedrock generally are necessary. Constructing local roads on the contour, if possible, and planting suitable grasses on roadbanks can reduce the hazard of erosion. The underlying bedrock hinders road construction in some areas. The underlying bedrock and the slope are the main limitations on sites for septic tank absorption fields. The distribution lines should be installed across the slope. The bedrock can hinder the installation of distribution lines in many areas.

The included soils may be better suited to intended land uses than the Hollis and Chatfield soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas. Where the Hollis and Chatfield soils are mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The land capability classification is VIIs.

914E—Marlow-Berkshire association, steep, extremely stony. These moderately steep to very steep, very deep, well drained soils are on the sides of hills and mountains. The Marlow soil typically is on the lower, less steep slopes and in concave areas. The Berkshire soil is on the steeper, higher slopes. Slopes range from 15 to 45 percent. Stones and boulders cover 3 to 15 percent of the surface and are prominent landscape features. Individual areas are irregularly shaped and range from 50 to 300 acres in size. This

unit is about 60 percent Marlow soil, 20 percent Berkshire soil, and 20 percent other soils.

Typically, the surface layer of the Marlow soil is very dark grayish brown, friable loam about 2 inches thick. The subsoil is about 22 inches thick. In sequence downward, it is 4 inches of dark brown, friable loam; 8 inches of yellowish red, friable loam; and 10 inches of light olive brown, friable fine sandy loam. The substratum to a depth of 65 inches or more is firm gravelly fine sandy loam. It is olive in the upper part and dark grayish brown in the lower part.

Typically, the surface layer of the Berkshire soil is dark brown, friable loam about 2 inches thick. The subsoil is about 16 inches thick. It is friable. In sequence downward, it is 4 inches of dark reddish brown loam, 4 inches of dark brown fine sandy loam, and 8 inches of brown fine sandy loam. The upper 18 inches of the substratum is olive brown gravelly sandy loam, the next 6 inches is light olive brown sandy loam, and the lower 25 inches is brown gravelly sandy loam.

Included with these soils in mapping are the moderately well drained Peru soils in the less sloping areas on hillsides and the shallow Lyman soils on hillsides. Also included are soils that have slopes of more than 15 percent. Included areas make up about 10 to 15 percent of the unit and are as much as 20 acres in size.

Permeability is moderate in the solum of the Marlow soil and moderately slow or slow in the substratum. It is moderate or moderately rapid throughout the Berkshire soil. The available water capacity is high in both soils. The Marlow soil has a perched seasonal high water table at a depth of about 2 feet in early spring. The root zone extends into the substratum of the Berkshire soil. It is restricted by the firm or very firm substratum in the Marlow soil. The Marlow soil is very strongly acid to moderately acid. The Berkshire soil is extremely acid to moderately acid.

Most areas are used as woodland. Some areas have been cleared, and some are used for recreational purposes. Because of the slope and the surface stones, these soils are generally unsuited to cultivated crops and to hay and pasture.

The potential productivity is very high for eastern white pine on the Berkshire soil and moderate for northern red oak on the Marlow soil. The main management concerns are the large stones and boulders, the slope, and a severe hazard of erosion. The stones and boulders and the slope restrict the use of equipment in most areas. Hand planting generally is needed. Constructing access roads and trails on the contour and installing water bars help to prevent excessive erosion. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and help to control runoff and erosion. Plant competition is moderate. Removing undesirable stock, such as dead or diseased trees, and thinning dense stands allow more vigorous growth and regeneration. Thinning also allows restocking or replanting of preferred trees. Removal and control of competing understory vegetation allow the optimum growth of newly established seedlings.

The main limitation affecting building site development and sanitary facilities is the slope. The shallowness of the included Lyman soils on hillsides is an additional limitation. The included Peru soils in the less sloping areas are limited by wetness, but they may be suitable for building site development and sanitary facilities if corrective measures overcome the wetness. Onsite investigation may identify additional areas of soils that are suitable for these uses.

The land capability classification is VIIs.

915E—Montauk-Canton association, steep, extremely stony. These very deep, well drained soils are on the sides of hills and mountains. The Montauk soil typically is on the lower, less steep slopes and in concave areas. The Canton soil is on the steeper, higher slopes. Slopes range from 15 to 45 percent. Stones and boulders cover 3 to 15 percent of the surface and are prominent landscape features. Individual areas are irregularly shaped and range from 50 to 100 acres in size. This unit is about 60 percent Montauk soil, 25 percent Canton soil, and 15 percent other soils.

Typically, the surface layer of the Montauk soil is very dark grayish brown, friable loam about 7 inches thick. The subsoil is very friable fine sandy loam about 17 inches thick. It is dark yellowish brown in the upper 9 inches and olive brown in the lower 8 inches. The substratum to a depth of 65 inches or more is olive, very firm loamy sand.

Typically, the surface layer of the Canton soil is very dark grayish brown, very friable fine sandy loam about 3 inches thick. The subsoil is about 27 inches thick. It is very friable. The upper 8 inches is dark yellowish brown fine sandy loam. The lower 19 inches is yellowish brown gravelly fine sandy loam. The substratum to a depth of 65 inches or more is friable gravelly loamy sand. It is light olive brown in the upper 6 inches and olive in the lower 29 inches.

Included with these soils in mapping are the moderately well drained Scituate soils in the less sloping areas on hillsides and the shallow Hollis and moderately deep Chatfield soils on the crest of hills. Also included are soils that have slopes of less than 15 percent. Included areas make up about 15 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the solum of the Montauk soil and moderately slow or slow in the substratum. It is moderately rapid in the solum of the Canton soil and rapid in the substratum. The available water capacity is moderate in both soils. The Montauk soil has a perched seasonal high water table at a depth of about 2 feet in early spring. The root zone is restricted by the firm or very firm substratum in the Montauk soil. It extends into the substratum of the Canton soil. The Montauk soil is extremely acid to moderately acid. The Canton soil is very strongly acid to moderately acid.

Most areas are used as woodland. Some areas have been cleared, and some are used for recreational purposes. Because of the slope and the surface stones, these soils are generally unsuited to cultivated crops and to hay and pasture.

The potential productivity is moderate for northern red oak on the Montauk soil and high for eastern white pine on the Canton soil. The main management concerns are the large stones and boulders, the slope, and a severe hazard of erosion. The stones and boulders and the slope restrict the use of equipment in most areas. Hand planting generally is needed. Constructing access roads and trails on the contour and installing water bars help to prevent excessive erosion. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and help to control runoff and erosion. Plant competition is moderate. Removing undesirable stock, such as dead or diseased trees, and thinning dense stands allow more vigorous growth and regeneration. Thinning also allows restocking or replanting of preferred trees. Removal and control of competing understory vegetation allow the optimum growth of newly established seedlings.

The main limitation affecting building site development and sanitary facilities is the slope. The shallowness of the included Hollis soils on the crest of hills is an additional limitation. The included Scituate soils in the less sloping areas are limited by wetness, but they may be suitable for building site development and sanitary facilities if corrective measures overcome the wetness. Onsite investigation may identify additional areas of soils that are suitable for these uses.

The land capability classification is VIIs.

916E—Paxton-Charlton association, steep, extremely stony. These very deep, well drained soils are on the sides of hills and mountains. The Paxton soil typically is on the lower, less steep slopes and in concave areas. The Charlton soil is on the steeper, higher slopes. Slopes range from 15 to 45 percent. Stones and boulders cover 3 to 15 percent of the surface and are prominent landscape features. Individual areas are irregularly shaped and range from 50 to 300 acres in size. This unit is about 75 percent Paxton soil, 20 percent Charlton soil, and 5 percent other soils.

Typically, the surface layer of the Paxton soil is very dark grayish brown, very friable fine sandy loam about 2 inches thick. The subsoil is friable fine sandy loam about 16 inches thick. It is dark yellowish brown in the upper 3 inches and yellowish brown in the lower 13 inches. The substratum to a depth of 65 inches or more is olive, very firm fine sandy loam.

Typically, the surface layer of the Charlton soil is dark brown, very friable fine sandy loam about 8 inches thick. The subsoil is about 24 inches thick. The upper 14 inches is gray, very friable fine sandy loam. The lower 10 inches is light olive brown, friable fine sandy loam. The substratum to a depth of 65 inches or more is light olive brown, friable fine sandy loam.

Included with these soils in mapping are the moderately well drained Woodbridge soils in the less sloping areas on hillsides and the shallow Hollis and moderately deep Chatfield soils on hillsides. Also included are soils that have slopes of less than 15 percent. Included areas make up about 5 percent of the unit and are as much as 20 acres in size.

Permeability is moderate in the solum of the Paxton soil and slow or very slow in the substratum. It is moderate or moderately rapid throughout the Charlton soil. The available water capacity is high in both soils. The Paxton soil has a perched seasonal high water table at a depth of about 2 feet in early spring. The root zone is restricted by the firm or very firm substratum in the Paxton soil. It extends into the substratum of the Charlton soil. The soils are very strongly acid to moderately acid.

Most areas are used as woodland. Some areas have been cleared, and some are used for recreational purposes. Because of the slope and the surface stones, these soils are generally unsuited to cultivated crops and to hay and pasture.

The potential productivity for northern red oak is moderate. The main management concerns are the large stones and boulders, the slope, and a severe hazard of erosion. The stones and boulders and the slope restrict the use of equipment in most areas. Hand planting generally is needed. Constructing access roads and trails on the contour and installing water bars help to prevent excessive erosion. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and help to control runoff and erosion. Plant competition is moderate. Removing undesirable stock, such as dead or diseased trees, and thinning dense stands allow

more vigorous growth and regeneration. Thinning also allows restocking or replanting of preferred trees. Removal and control of competing understory vegetation allow the optimum growth of newly established seedlings.

The main limitation affecting building site development and sanitary facilities is the slope. The shallowness of the included Hollis soils on hillsides is an additional limitation. The included Woodbridge soils in the less sloping areas are limited by wetness, but they may be suitable for building site development and sanitary facilities if corrective measures overcome the wetness. Onsite investigation may identify additional areas of soils that are suitable for these uses. Where the Paxton and Charlton soils are mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when the floodgates are closed.

The land capability classification is VIIs.

919C—Scituate-Montauk association, rolling, extremely stony. These very deep soils are on the sides and crest of glacial uplands. The moderately well drained Scituate soil typically is on the lower parts of slopes and in slightly concave areas. The well drained Montauk soil is on the upper parts of slopes and in convex areas. Slopes range from 3 to 15 percent. Stones and boulders cover approximately 3 to 15 percent of the surface and are prominent landscape features. Individual areas are irregularly shaped and range from 10 to 300 acres in size. This unit is about 45 percent Scituate soil, 45 percent Montauk soil, and 10 percent other soils.

Typically, the surface layer of the Scituate soil is very dark grayish brown, friable fine sandy loam about 10 inches thick. The subsoil is about 13 inches thick. The upper 9 inches is yellowish brown, friable gravelly fine sandy loam. The lower 4 inches is light olive brown, mottled, firm gravelly sandy loam. The substratum to a depth of 65 inches or more is light brownish gray to olive gray, mottled, firm gravelly sandy loam to gravelly loamy sand.

Typically, the surface layer of the Montauk soil is very dark grayish brown, friable loam about 7 inches thick. The subsoil is very friable fine sandy loam about 17 inches thick. It is dark yellowish brown in the upper 9 inches and olive brown in the lower 8 inches. The substratum to a depth of 65 inches or more is olive, very firm loamy sand.

Included with these soils in mapping are the poorly drained Ridgebury soils on nearly level slopes and in depressions. Also included are the shallow Hollis and moderately deep Chatfield soils on hillsides and small areas of soils that have slopes of more than 15 percent. Included areas make up about 10 to 20 percent of the unit and are as much as 20 acres in size.

Permeability is moderate in the solum of the Scituate soil and slow in the substratum. It is moderate or moderately rapid in the solum of the Montauk soil and moderately slow or slow in the substratum. The available water capacity is moderate in both soils. A perched seasonal high water table is at a depth of about 20 inches in the Scituate soil and 24 inches in the Montauk soil for brief periods during winter and spring and after prolonged rains. The root zone is restricted by the firm or very firm substratum in these soils. The Scituate soil is very strongly acid to moderately acid. The Montauk soil is strongly acid or moderately acid.

Most areas are used as woodland. The potential productivity for northern red oak is moderate. The main management concerns are the large surface stones and boulders and plant competition. The stones and boulders impede the use of harvesting and planting equipment. In some areas hand planting is needed. Thinning crowded stands to standard stocking levels and removing diseased, deformed, or otherwise undesirable trees allow more vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting provide suitable sites for natural regeneration or for planting. In some areas removal or control of competing understory vegetation is needed for the best growth of newly established seedlings.

If these soils are used as sites for buildings, constructing the lower or basement level above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Land shaping is needed in some areas. Constructing on well compacted, coarse textured base material helps to protect local roads from the damage caused by frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The included soils may be better suited to intended land uses than the Scituate and Montauk soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

920E—Shelburne-Ashfield association, steep, extremely stony. These very deep soils are on the sides of hills and mountains. The well drained Shelburne soil typically is on the steeper, higher slopes. The moderately well drained Ashfield soil is on the lower, less steep slopes and in concave areas. Slopes

range from 15 to 45 percent. Stones and boulders cover 3 to 15 percent of the surface and are prominent landscape features. Individual areas are irregularly shaped and range from 50 to 300 acres in size. This unit is about 65 percent Shelburne soil, 25 percent Ashfield soil, and 10 percent other soils.

Typically, the surface layer of the Shelburne soil is very dark grayish brown, friable fine sandy loam about 6 inches thick. The subsoil is friable fine sandy loam about 13 inches thick. It is dark yellowish brown in the upper 3 inches, olive brown in the next 5 inches, and dark grayish brown in the lower 5 inches. The substratum to a depth of 65 inches or more is olive, firm fine sandy loam.

Typically, the surface layer of the Ashfield soil is very dark grayish brown, very friable fine sandy loam about 3 inches thick. The subsoil is fine sandy loam about 19 inches thick. It is dark yellowish brown and friable in the upper 12 inches and yellowish brown, mottled, and firm in the lower 7 inches. The substratum to a depth of 65 inches or more is olive gray, mottled, very firm sandy loam.

Included with these soils in mapping are the moderately deep Millsite and shallow Westminster soils on hillsides. Also included are soils that have slopes of less than 15 percent. Included areas make up about 10 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the solum of the Shelburne and Ashfield soils and slow in the substratum. The available water capacity is low in the Shelburne soil and high in the Ashfield soil. A perched seasonal high water table is above the dense substratum in these soils for brief periods during winter and spring and after prolonged rains. The root zone is restricted by the firm or very firm substratum. The Ashfield soil is very strongly acid or strongly acid in the solum and strongly acid to slightly acid in the substratum. The Shelburne soil is very strongly acid to moderately acid.

Most areas are used as woodland. Some areas have been cleared and no are longer stony, and some are used for recreational purposes. Because of the slope and the surface stones, these soils are generally unsuited to cultivated crops and to hay and pasture.

The potential productivity is very high for eastern white pine on the Shelburne soil and moderate for northern red oak on the Ashfield soil. The main management concerns are the large stones and boulders, the slope, and a severe hazard of erosion. The stones and boulders and the slope restrict the use of equipment in most areas. Hand planting generally is needed. Constructing access roads and trails on the contour and installing water bars help to prevent excessive erosion. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and help to control runoff and erosion. Plant competition is moderate. Removing undesirable stock, such as dead or diseased trees, and thinning dense stands allow more vigorous growth and regeneration. Thinning also allows restocking or replanting of preferred trees. Removal and control of competing understory vegetation allow the optimum growth of newly established seedlings.

The main limitation affecting building site development and sanitary facilities is the slope. The moderate depth to bedrock in the included Millsite soils on hillsides is an additional limitation. The included Pillsbury soils in the less sloping areas are limited by wetness, but they may be suitable for building site development and sanitary facilities if corrective measures overcome the wetness. Onsite investigation may identify additional areas of soils that are suitable for these uses.

The land capability classification is VIIs.

921C—Westminster-Millsite association, rolling, extremely stony. These soils formed in glacial till on the sides and top of hills and mountains. The shallow, somewhat excessively drained Westminster soil is on the upper parts of slopes and in convex areas. The moderately deep, well drained Millsite soil typically is on the flatter parts of slopes between areas of rock outcrops. Slopes range from 3 to 15 percent. Stones, boulders, and rock outcrops cover approximately 3 to 15 percent of the surface and are prominent landscape features. Individual areas are irregularly shaped and range from 30 to 500 acres in size. This unit is about 60 percent Westminster soil, 35 percent Millsite soil, and 5 percent other soils and rock outcrops.

Typically, the surface layer of the Westminster soil is very dark grayish brown, friable loam about 3 inches thick. The subsoil is about 15 inches thick. The upper part is 6 inches of dark yellowish brown, friable loam over 5 inches of brown fine sandy loam. The lower part is 4 inches of dark brown, friable sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Millsite soil is very dark grayish brown, friable loam about 6 inches thick. The subsoil is about 29 inches thick. The upper part is 7 inches of dark yellowish brown, friable fine sandy loam over 7 inches of light olive brown fine sandy loam. The lower 15 inches is olive brown, friable gravelly fine sandy loam. The underlying bedrock typically is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Included with these soils in mapping are areas of rock outcrop and the very deep Shelburne and Ashfield

soils. Also included are poorly drained and very poorly drained soils in some depressions and nearly level areas and soils that have slopes of more than 15 percent. Included areas make up about 5 percent of the unit and are as much as 20 acres in size.

Permeability is moderately rapid in the Westminster soil and moderate or moderately rapid in the Millsite soil. The available water capacity is low in the Westminster soil and moderate in the Millsite soil. Bedrock is within a depth of 20 inches in the Westminster soil and at a depth of 20 to 40 inches in the Millsite soil. The rooting depth is limited by the shallowness to bedrock. The soils are very strongly acid to slightly acid.

Most areas are used as woodland. Because of the surface stones and the exposed bedrock, these soils are poorly suited to cultivated crops and to hay and pasture.

The potential productivity for sugar maple is moderate. Windthrow is a moderate hazard because of the shallowness to bedrock. Generally, the soils are droughty. In some years seedling mortality is severe. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and conserve soil moisture. Thinning generally should be avoided because of the hazard of windthrow. Removing and controlling competing understory vegetation can increase the growth and survival rates of newly planted trees.

Excavating during building site development may be difficult because of the underlying bedrock. The bedrock can hinder road construction. Large machinery is generally required for excavations. The shallowness to bedrock is the main limitation on sites for septic tank absorption fields. The bedrock can hinder the installation of distribution lines.

The included soils may be better suited to intended land uses than the Westminster and Millsite soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

921E—Westminster-Millsite association, steep, extremely stony. These soils formed in extremely stony glacial till on mountainous uplands. The shallow, somewhat excessively drained Westminster soil typically is on the upper steep slopes. The moderately deep, well drained Millsite soil typically is on less sloping parts of the landscape and in pockets between areas of the Westminster soil and areas of bedrock outcrops. Slopes range from 15 to 45 percent. Bedrock outcrops, stones, and boulders cover approximately 3 to 15 percent of the surface and are prominent landscape features. Individual areas are irregularly shaped and range from 50 to 350 acres in size. This unit is about 65 percent Westminster soil, 20 percent Millsite soil, 5 percent other soils, and 10 percent rock outcrop.

Typically, the surface layer of the Westminster soil is very dark grayish brown, friable loam about 3 inches thick. The subsoil is about 15 inches thick. The upper part is 6 inches of dark yellowish brown, friable loam over 5 inches of brown fine sandy loam. The lower part is 4 inches of dark brown, friable sandy loam. The underlying bedrock is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Typically, the surface layer of the Millsite soil is very dark grayish brown, friable loam about 6 inches thick. The subsoil is about 29 inches thick. The upper part is 7 inches of dark yellowish brown, friable fine sandy loam over 7 inches of light olive brown fine sandy loam. The lower 15 inches is olive brown, friable gravelly fine sandy loam. The underlying bedrock typically is fractured at the surface but solid underneath. It consists of schist, gneiss, and granite.

Included with these soils in mapping are areas of rock outcrop and the very deep Shelburne soils on steep hillsides and mountain slopes. Also included are small areas of soils that have slopes of less than 15 percent. Included areas make up about 10 to 15 percent of the unit and are as much as 20 acres in size.

Permeability is moderately rapid in the Westminster soil and moderate or moderately rapid in the Millsite soil. The available water capacity is low in the Westminster soil and moderate in the Millsite soil. Bedrock is within a depth of 20 inches in the Westminster soil and at a depth of 20 to 40 inches in the Millsite soil. The rooting depth is limited by the shallowness to bedrock. The soils are very strongly acid to slightly acid.

Most areas are used as woodland. Because of the slope, the shallowness to bedrock, and the exposed bedrock, these soils are generally unsuited to cultivated crops and to hay and pasture.

The potential productivity for sugar maple is moderate. The main management concerns are the shallowness to bedrock, the limited available water capacity, and the slope. Growth and survival rates are poor. The use of equipment is limited because of the rock outcrop and the slope. Thinning generally should be avoided because of a moderate hazard of windthrow. Minimizing surface disturbance and thus retaining the spongelike mulch of leaves increase the rate of water infiltration and help to control runoff and erosion. Onsite investigation is needed to identify areas where tree planting is practical if special management is applied.

The slope and the shallowness to bedrock are the main limitations affecting building site development. Extensive land shaping and blasting of bedrock generally are necessary. Constructing local roads on the contour, if possible, and planting suitable grasses on roadbanks can reduce the hazard of erosion. The underlying bedrock hinders road construction in some areas. The underlying bedrock and the slope are the main limitations on sites for septic tank absorption fields. The distribution lines should be installed across the slope. The bedrock can hinder the installation of distribution lines in many areas.

The included soils may be better suited to intended land uses than the Westminster and Millsite soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs.

922B—Pillsbury-Peacham-Wonsqueak association, undulating, extremely stony. These nearly level and gently sloping, very deep, poorly drained and very poorly drained soils are on foot slopes, in drainageways, and in slightly concave areas on glacial till uplands. Stones and boulders cover approximately 3 to 15 percent of the surface and are prominent landscape features. Individual areas are irregularly shaped and range from 30 to 300 acres in size. This unit is about 60 percent Pillsbury soil, 20 percent Peacham soil, 10 percent Wonsqueak soil, and 10 percent other soils.

Typically, the surface layer of the Pillsbury soil is very dark grayish brown, friable loam about 5 inches thick. The subsoil is mottled fine sandy loam about 14 inches thick. The upper 6 inches is olive gray and friable, and the lower 8 inches is dark gray and firm. The substratum to a depth of 65 inches or more is dark gray, mottled, very firm fine sandy loam.

Typically, the surface layer of the Peacham soil is black, friable organic material about 9 inches thick. The subsoil is grayish brown, mottled, firm fine sandy loam about 6 inches thick. The substratum to a depth of 65 inches or more is olive gray, mottled, firm fine sandy loam.

Typically, the surface tier of the Wonsqueak soil is very dark brown, friable organic material about 10 inches thick. Below this is dark brown and dark reddish brown organic material about 17 inches thick. The substratum to a depth of 65 inches or more is dark gray, very friable very fine sandy loam.

Included with this soil in mapping are areas of the moderately well drained Peru and Ashfield soils in the higher positions on the landscape and areas of the very poorly drained Lupton soils. Included areas make up about 10 percent of the unit and are as much as 20 acres in size.

Permeability is moderate in the subsoil of the Pillsbury soil and slow in the substratum. It is moderately slow to moderately rapid in the subsoil of the Peacham soil and very slow or slow in the substratum. It is moderate in the organic part of the Wonsqueak soil and slow or very slow in the underlying mineral material. The available water capacity is moderate in the Pillsbury soil, very low in the Peacham soil, and high in the Wonsqueak soil. The water table is at or near the surface of the Pillsbury soil and near or above the surface of the Peacham and Wonsqueak soils most of the year. The root zone is restricted by the high water table. Reaction is very strongly acid to moderately acid in the Pillsbury soil, very strongly acid to neutral in the Peacham soil, and very strongly acid to slightly acid in the Wonsqueak soil.

Most areas are used as woodland. In some areas the Pillsbury and Peacham soils have been cleared and are no longer stony. Some of these areas are used as unimproved pasture.

Because of the seasonal high water table and the surface stones, these soils are poorly suited to cultivated crops and to hay and pasture. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity in the areas used as woodland is moderate to high. Excess soil moisture, a high seedling mortality rate, and the hazard of windthrow are the main management concerns. The use of equipment is limited by low soil strength unless the soils are dry or frozen. When a stand is thinned, measures that reduce the hazard of windthrow are needed. This hazard can be reduced by keeping the residual stand density at or slightly above standard stocking levels and by limiting changes in stand density to 30 percent or less. Onsite investigation is needed to identify areas where tree planting is practical if special management is applied.

These soils are generally unsuitable for building site development because of the ponding and the structural damage caused by low soil strength. They are generally unsuitable as sites for septic tank absorption fields because of the ponding and the wetness. Soils that are better suited to these uses are generally nearby. Constructing on raised, well compacted, coarse textured base material and providing adequate roadside ditches and culverts help to protect local roads from the damage caused by ponding and low soil strength.

The included soils may be better suited to intended

land uses than the Pillsbury, Peacham, and Wonsqueak soils or have limitations that are more severe. Onsite investigation is needed to assess the suitability of particular areas.

The land capability classification is VIIs in areas of the Pillsbury and Peacham soils and Vw in areas of the Wonsqueak soil.

923B—Ridgebury-Whitman-Palms association, undulating, extremely stony. These nearly level and gently sloping, very deep, poorly drained and very poorly drained soils are on foot slopes, in drainageways, and in slightly concave areas on glacial till uplands. Stones and boulders cover approximately 3 to 15 percent of the surface and are prominent landscape features. Individual areas are irregularly shaped and range from 10 to 300 acres in size. This unit is about 65 percent Ridgebury soil, 15 percent Whitman soil, 10 percent Palms soil, and 10 percent other soils.

Typically, the surface layer of the Ridgebury soil is black, very friable fine sandy loam about 7 inches thick. The upper part of the subsoil is olive gray, mottled, firm gravelly fine sandy loam about 13 inches thick. The lower part is yellowish brown, mottled, firm gravelly sandy loam about 4 inches thick. The substratum to a depth of 65 inches or more is light olive brown, mottled, very firm gravelly sandy loam.

Typically, the surface layer of the Whitman soil is very dark gray, friable mucky loam about 8 inches thick. The subsoil is very dark gray, friable silt loam about 2 inches thick. The substratum to a depth of 65 inches or more is mottled sandy loam. The upper 18 inches is dark gray and is friable and firm, the next 7 inches is gray and firm, and the lower 30 inches is olive gray and firm.

Typically, the surface layer of the Palms soil is dark reddish brown, friable sapric material about 11 inches thick. Below this is dark reddish brown and dark brown organic material about 36 inches thick. The substratum to a depth of 65 inches or more is black, firm sandy loam.

Included with these soils in mapping are the moderately well drained, stony Scituate and Woodbridge soils in the higher positions on the landscape and the very poorly drained, very deep Lupton soils in depressions or pockets. Included areas make up about 10 percent of the unit and are as much as 20 acres in size.

Permeability is moderate or moderately rapid in the solum of the Ridgebury and Whitman soils and slow or very slow in the substratum. It is moderately slow to moderately rapid in the organic part of the Palms soil and moderate or moderately slow in the mineral substratum. The available water capacity is moderate in the Ridgebury and Whitman soils and high in the Palms soil. A perched seasonal high water table is at a depth of about 10 inches in the Ridgebury soil during winter and spring and after prolonged rains. The water table in areas of the Whitman and Palms soils is near or above the surface most of the year. The root zone is restricted by the firm or very firm substratum in the three soils. The Palms soil is very strongly acid to neutral, the Ridgebury soil is very strongly acid to moderately acid, and the Whitman soil is very strongly acid to slightly acid.

Most areas are used as woodland. Some areas have been cleared and are no longer stony. Some of these areas are used as unimproved pasture.

Because of the seasonal high water table and the surface stones, these soils are poorly suited to cultivated crops and to hay and pasture. Proper stocking rates, timely deferment of grazing, and pasture rotation help to maintain desirable species of pasture plants.

The potential productivity is moderate for northern red oak on the Ridgebury soil and for red maple on the Whitman and Palms soils. Excess soil moisture, a high seedling mortality rate, and the hazard of windthrow are the main management concerns. The use of equipment is limited by low soil strength unless the soils are dry or frozen. When a stand is thinned, measures that reduce the hazard of windthrow are needed. This hazard can be reduced by keeping the residual stand density at or slightly above standard stocking levels and by limiting changes in stand density to 30 percent or less. Onsite investigation is needed to identify areas where tree planting is practical if special management is applied.

Buildings in areas of these soils should be constructed without basements. Constructing the buildings above the seasonal high water table helps to prevent the interior damage caused by excessive wetness. Tile drains around foundations help to remove excess subsurface water. Proper landscaping helps to drain surface water away from the buildings. Constructing on raised, well compacted, coarse textured base material and providing adequate roadside ditches and culverts help to protect local roads from the damage caused by wetness and frost action. The seasonal high water table and the restricted permeability are the main limitations on sites for septic tank absorption fields. Installing the distribution lines in a mound of suitable fill material helps to overcome these limitations.

The included soils may be better suited to intended land uses than the Ridgebury, Whitman, and Palms soils or have limitations that are more severe. Onsite

investigation is needed to assess the suitability of particular areas. Where the Ridgebury, Whitman, and Palms soils are mapped within the Knightville Reservoir area, temporary inundation occurs during periods of heavy rainfall when floodgates are closed.

The land capability classification is VIIs in areas of the Ridgebury and Whitman soils and Vw in areas of the Palms soil.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

More than 11,100 acres in the survey area, or about 4 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the survey area, but most are in the central part. Almost all of the prime farmland is used for crops, mainly corn and vegetables.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment *(8)*. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify limitations of each soil for specific land uses and to help to prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Richard J. DeVergilio, district conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

The agriculture of the survey area reflects the dominant frigid soil temperatures. Pasture and hay crops are grown on approximately 4,500 acres in the survey area. They are the major crops supporting the limited number of dairy farms in the area. Approximately 100 acres of silage corn and 100 acres of vegetable crops are within the mesic soil region of Westhampton. Potatoes are grown on approximately 850 acres on the hills of Worthington and Plainfield. Fruit crops are suited to the area. About 750 acres is used for orchard crops and 350 acres for bush fruit.

The main concerns in managing the cropland and pasture in the survey area are erosion, drainage, and fertility. Erosion is a hazard if the more sloping areas are cropped or reseeded. Much of the acreage used for potatoes or for pasture or hay is in these areas. Loss of the surface layer through erosion can significantly lower the fertility level of the soil and can result in sedimentation in nearby areas. Effective cropping sequences, stripcropping, contour farming, diversions, grassed waterways, conservation tillage, minimum tillage, or a combination of these can reduce the hazard of erosion.

Natural fertility is low in the soils in the survey area. The naturally acidic nature of the soils favors potatoes and bush fruits, such as blueberries. Regular applications of lime are needed to achieve a reaction of slightly acid or neutral, which is needed for the highest yields of pasture, hay, corn, and vegetable crops and, to some degree, orchard crops. Applications of fertilizer

are needed to offset the naturally low levels of available phosphorus and potassium in the soils.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of the map units is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Douglas D. Leab, RC&D forester, Massachusetts Department of Environmental Management, helped prepare this section.

Approximately 220,000 acres in this survey area, or more than 85 percent of the total acreage, is forested. The forests vary considerably because of differences in kinds of soil, elevation, and moisture regimes. The location of the survey area, in a transitional zone between the northern and central hardwood regions, increases the effects of these differences on forest composition. The dominant forest types are elm-ash-red maple, maple-beech-birch, oak-hickory, and white pine-red pine-hemlock *(7)*. Individual species of high commercial value include red oak, white ash, black cherry, sugar maple, and white pine.

Most of the woodland in the survey area consists of second or third growth forests in areas of abandoned agricultural land. As of 1987, the stands were rapidly changing from poletimber to sawtimber. The yield of sawtimber increased by about 70 percent between 1972 and 1985. Trees are the raw material for a forest industry that presently includes 46 logging firms and 21 sawmills in Hampden and Hampshire Counties.

The vast majority of the forest land in Massachusetts is held by private owners in average parcel sizes of about 25 acres. The size of ownerships is generally larger in the survey area. About 115 properties totaling about 60,000 acres are certified as Tree Farms under the American Forest Council Tree Farm program. Three of these properties, totaling 24,000 acres, are municipal watersheds.

In 1986, Hampden and Hampshire Counties produced a total of about 17.6 million board feet of sawtimber and 17,000 cords of fuelwood and pulpwood. These products came from sales on about 9,000 acres of woodland.

As the purpose of ownership, timber production is rated very low among landowners in the counties when compared to other interests, such as investment and recreation. Because of this low interest in forest management, much of the forest land in the survey area is overstocked with poor-quality timber. The Forest Service figures for western Massachusetts show that timber growth exceeds harvests and mortality by a margin of 3 to 1. Increased management of the valuable and renewable timber resource in the survey area would lead to healthier, more productive woodland.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight*, *moderate*, and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Recreation

Because of an abundance of rolling hills and crystal-clear streams and rivers, the western part of Hampden and Hampshire Counties offers many opportunities for recreation to the people of southern New England. The survey area has some lake developments, many camp areas, and several large tracts of State forest with a variety of recreational facilities.

Abandoned mines and bedrock outcrops in the towns of Chester and Russell are a source of rocks and minerals for geologists. Some of the most sought after minerals are serpentine, chlorite, diaspore, margarite, malachite, and mica.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few

or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Anthony A. Gola, game manager, Massachusetts Division of Fisheries and Wildlife, helped prepare this section.

The towns of western Hampden and Hampshire Counties are rural communities having a broad range of agricultural lands, including dairy and potato farms. The combination of agriculture, climate, topography, soils, and vegetation results in diverse wildlife habitats.

Habitat changes and exploitation in the past resulted in a drastic reduction or even expiration of many animals, such as white-tailed deer, black bear, fisher, mountain lion, timber wolf, and wild turkey. As habitats once again became favorable, many of these species eventually returned. The return of some of the species, such as wild turkey, required human intervention. Other species, such as the mountain lion and timber wolf, have yet to return. The eastern coyote, a newcomer to Massachusetts, has filled this niche.

Although some species in the survey area now thrive in greater numbers than during the precolonial past, others have become threatened. No fewer than 20 plant species and 2 mammal, 2 bird, 2 reptile, 1 amphibian, and 1 fish species are currently listed as species of special concern or as endangered species by the Massachusetts Natural Heritage and Endangered Species Program.

One factor vital to species protection is habitat protection. The Division of Forests and Parks and the Division of Fisheries and Wildlife together own nearly 24,000 acres in this survey area. The U.S. Army Corps of Engineers and the Massachusetts Audubon Society account for another 5,000 acres. Also, approximately 3,800 acres of ponds and reservoirs is protected through public ownership or as public rights-of-way. This last figure does not include the acreage of protected watershed.

The terrain in this survey area is very rugged. Elevations range from about 180 feet above sea level in an area along the Westfield River in Russell to 2,160 feet on top of Bryant Mountain, in Cummington. The composition of the dominant tree species gradually changes from the lower to the higher elevations.

The most conspicuous inhabitants of the wooded areas are birds. At the peak of the spring migration in May, a good observer with a little luck could see more than 100 species of birds in one of these areas in a single day. Some of the more common species are wood thrush, veery, ovenbird, red-eyed vireo, yellow-bellied sapsucker, blue jay, black and white warbler, and Swainson's thrush. The mammalian inhabitants of the wooded areas include white-tailed deer, gray squirrel, red squirrel, chipmunk, porcupine, black bear, snowshoe hare, eastern cottontail rabbit, striped skunk, raccoon, and coyote. The most common reptiles and amphibians (known collectively as "herpes") are red eft (a terrestrial form of the red-spotted newt), red-backed salamander, American toad, spring peeper, wood frog, northern brown snake, northern red-bellied snake, and eastern milk snake.

Open fields, meadows, and pastures are favorite habitats for numerous species, including many of those that inhabit the forested areas. Many species require an interspersion of a variety of habitats to ensure maximum growth and survival. For example, turkeys with their broods of chicks are commonly observed searching for insects in fields. White-tailed deer often give birth in fields of hay during late spring and early summer.

The most common birds in open fields, meadows, and pastured areas are song sparrow, savannah sparrow, crow, tree swallow, barn swallow, bobolink, kestrel, and bluebird. The most common mammals are red fox, woodchuck, meadow vole, short-tailed shrew,

and meadow jumping mouse. The most common herpes are smooth green snake, eastern garter snake, leopard frog, and pickerel frog. The latter two species generally inhabit wet meadows.

Streams, rivers, ponds, swamps, and vernal pools provide aquatic habitats for many species. The major rivers in this survey area are the Westfield River and the Farmington River. The Westfield River consists of three branches. The area has about 30 ponds and numerous beaver flowages and vernal pools ranging in size from a few square yards to more than 1,000 acres in the Cobble Mountain Reservoir.

Fish and some amphibians spend their entire life cycles in water. Several other amphibians can successfully reproduce only in vernal pools. All of these animals are sensitive to the effects of acid precipitation. Vernal pools are particularly vulnerable to acidification because of their extremely low buffering capacity. The ability of a pond to buffer the effects of acid rain is measured by its dissolved alkalinity. Alkalinity is determined largely by the chemical composition of the soils and underlying bedrock throughout the watershed. Most of the larger ponds in the survey area are sensitive to acid precipitation but are not endangered by it.

Many species of birds are in the aquatic habitats. Examples are red-winged blackbird, song sparrow, swamp sparrow, common grackle, and tree swallow. The waterfowl that nest in the survey area include Canada goose, wood duck, black duck, and hooded merganser. A few of the rarer species are American bittern, bald eagle, common loon, and long-billed marsh wren. Beaver, otter, mink, and muskrat are common mammalian inhabitants.

The most common aquatic herpes are snapping turtle, painted turtle, northern water snake, red-spotted newt, bull frog, and green frog. Spring peepers and wood frogs are more often heard than seen, especially during their early spring breeding season.

No fewer than 20 species of fish inhabit the ponds and streams in the survey area. The most common species in the ponds are pumpkinseed, yellow perch, chain pickerel, largemouth bass, and brown bullhead. The most common species in the streams and rivers are blacknose dace, longnose dace, slimy sculpin, white sucker, and brook trout.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild

herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given of building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, the shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems,

ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties and site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where all the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. They are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. The depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), the shrink-swell potential, the potential for frost action, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor*

indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe *(12)*. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, rock fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard

construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are

easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability in the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability in the aquifer, and quality of the water as inferred from the salinity of the soil. The depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils *(9)*. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated content of clay in each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

Soils in table 16 may be assigned to two hydrologic groups. Dual grouping is used for one of two reasons. Some soils have a seasonal high water table but can be drained. In this instance, the first letter is for drained areas and the second is for undrained areas. For some soils that are less than 20 inches deep over bedrock, the first letter is for areas where the bedrock is cracked and pervious and the second is for areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable period of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional*, or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are depth to the seasonal high water table; the kind of water table, that is, perched or apparent; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that

intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(10)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is *Aquept* (Aqu, meaning water, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is *Haplaquepts* (Hapl, meaning minimal horizonation, plus *aquept*, the suborder of the Inceptisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. An example is Aeric Haplaquepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(11)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(10)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Ashfield Series

The Ashfield series consists of very deep, moderately well drained soils on uplands. These soils formed in glacial till derived mainly from micaceous schist. Slopes range from 0 to 15 percent.

Ashfield soils are similar to Peru soils and in many areas are adjacent to Pillsbury soils. Unlike Ashfield soils, Peru soils have a spodic horizon. Pillsbury soils have a subsoil that is grayer than that of the Ashfield soils.

Typical pedon of Ashfield fine sandy loam, 3 to 8 percent slopes, in a wooded area of Granville State Forest, about 3,200 feet south of the intersection of Route 57 and West Hartland Road and 100 feet east of West Hartland Road, in the town of Granville:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak coarse granular structure; very friable; many medium and common large roots; about 5 percent rock fragments; strongly acid; clear smooth boundary.

Bw1—3 to 15 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate coarse subangular blocky structure; friable; common medium roots; about 5 percent rock fragments; strongly acid; clear smooth boundary.

Bw2—15 to 22 inches; yellowish brown (10YR 5/4) fine sandy loam; very few fine distinct gray (N 6/0) and many medium prominent reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; about 5 percent rock fragments; strongly acid; abrupt wavy boundary.

Cd—22 to 65 inches; olive gray (5Y 5/2) sandy loam; common medium prominent strong brown (7.5YR 5/8) and few fine distinct white (N 8/0) mottles; strong thick platy structure; very firm; about 10 percent rock fragments; moderately acid.

Depth to the dense substratum ranges from 20 to 35 inches. The solum is fine sandy loam, loam, or the gravelly analogs of those textures. The Cd horizon is loam, fine sandy loam, sandy loam, or the gravelly analogs of those textures. The content of rock fragments ranges from 5 to 25 percent throughout the profile. Reaction is strongly acid in the solum and strongly acid to slightly acid in the Cd horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 4.

The upper part of the B horizon has hue of 2.5Y to 10YR, value of 3 or 4, and chroma of 2 to 4. The lower part has hue of 2.5Y to 10YR, value of 3 to 5, and chroma of 3 or 4.

The Cd horizon has hue of 2.5Y or 5Y, value of 3 to 5, and chroma of 1 to 3. It is firm or very firm.

Berkshire Series

The Berkshire series consists of very deep, well drained soils on uplands. These soils formed in glacial till derived mainly from granite, gneiss, and schist. Slopes range from 15 to 45 percent.

Berkshire soils are similar to Marlow soils and in many areas are adjacent to Peru and Pillsbury soils. Unlike Berkshire soils, Marlow soils have a dense substratum and Peru and Pillsbury soils are mottled.

Typical pedon of Berkshire loam, in a wooded area of Marlow-Berkshire association, steep, extremely stony, 700 feet south of the junction of West Cummington Road and Luther Shaw Road, 75 feet west of Luther Shaw Road, in the town of Cummington:

Oa—1 inch to 0; dark reddish brown (5YR 2.5/2), moderately decomposed litter of organic material.

A—0 to 2 inches; dark brown (7.5YR 3/2) loam; weak fine granular structure; friable; common fine and medium roots; about 5 percent rock fragments; very strongly acid; abrupt wavy boundary.

Bhs—2 to 6 inches; dark reddish brown (5YR 3/4) loam; weak fine granular structure; friable; common fine and many medium roots; about 5 percent rock fragments; very strongly acid; clear wavy boundary.

Bs—6 to 10 inches; dark brown (7.5YR 3/4) fine sandy loam; weak fine and medium subangular blocky structure; friable; few fine and common medium roots; about 7 percent rock fragments less than 3 inches in size and 3 percent more than 3 inches; very strongly acid; clear wavy boundary.

Bw—10 to 18 inches; brown (10YR 4/3) fine sandy loam; weak fine and medium subangular blocky structure; friable; common fine and medium roots; about 10 percent rock fragments less than 3 inches in size and 3 percent more than 3 inches; very strongly acid; clear wavy boundary.

C1—18 to 30 inches; olive brown (2.5Y 4/4) gravelly sandy loam; weak fine and medium granular structure; very friable; about 20 percent rock fragments less than 3 inches in size and 3 percent more than 3 inches; very strongly acid; clear wavy boundary.

C2—30 to 36 inches; light olive brown (2.5Y 5/4) sandy loam; weak fine and medium granular structure; very friable; about 10 percent rock fragments less than 3 inches in size and 3 percent more than 3 inches; very strongly acid; clear wavy boundary.

C3—36 to 65 inches; olive (5Y 5/4) gravelly sandy loam; massive; loose; about 20 percent rock fragments less than 3 inches in size and 3 percent more than 3 inches; very strongly acid.

The thickness of the solum ranges from 18 to 36 inches. The solum and substratum are loam, fine sandy loam, or sandy loam in the fine-earth fraction. The content of rock fragments ranges from about 5 to 30

percent throughout the profile. In unlimed areas reaction is extremely acid to moderately acid throughout the profile.

The A horizon has hue of 5YR to 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. The Ap horizon has hue of 5YR to 10YR and value and chroma of 2 to 4.

The Bhs horizon has hue of 2.5YR to 7.5YR, value of 2 to 4, and chroma of 3 or 4. The Bs horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 4 to 8. The Bw horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 2 to 4.

The C horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 2 to 4.

Canton Series

The Canton series consists of very deep, well drained soils on uplands. These soils formed in glacial till derived mainly from schist, gneiss, and granitic material. Slopes range from 3 to 45 percent.

Canton soils are similar to Shelburne and Charlton soils and in many areas are adjacent to Scituate and Montauk soils. Unlike Canton soils, Shelburne, Scituate, and Montauk soils have a dense substratum and Charlton soils do not have contrasting textures.

Typical pedon of Canton fine sandy loam, in a wooded area of Montauk-Canton association, steep, extremely stony, 1,250 feet north of the intersection of Mine Road and Mineral Road, 100 feet east of Mine Road, in the town of Westhampton:

Oi—4 to 3 inches; undecomposed oak, poplar, and pine needle debris.

Oe—3 to 2 inches; partially decomposed oak, maple, and poplar leaves; many fine roots.

Oa—2 inches to 0; black (N 2/0) humus; many fine roots; strongly acid; abrupt smooth boundary.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; about 10 percent gravel and 5 percent cobbles; strongly acid; clear smooth boundary.

Bw1—3 to 11 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine subangular blocky structure; very friable; common fine and medium and few coarse roots; about 10 percent gravel and 5 percent cobbles; strongly acid; clear smooth boundary.

Bw2—11 to 22 inches; yellowish brown (10YR 5/6) gravelly fine sandy loam; weak medium subangular blocky structure; very friable; few fine to coarse roots; about 20 percent gravel and 10 percent cobbles; moderately acid; clear smooth boundary.

Bw3—22 to 30 inches; yellowish brown (10YR 5/6) gravelly fine sandy loam; massive; very friable; few fine to coarse roots; about 20 percent gravel and 5 percent cobbles; moderately acid; abrupt smooth boundary.

2C1—30 to 36 inches; light olive brown (2.5Y 5/3) gravelly loamy sand; massive; friable; about 25 percent gravel and 15 percent cobbles; moderately acid; clear smooth boundary.

2C2—36 to 65 inches; olive (5Y 5/3) gravelly loamy sand; massive; friable; about 25 percent gravel and 15 percent cobbles; moderately acid.

The thickness of the solum ranges from 20 to 36 inches. The content of rock fragments ranges from 5 to 25 percent in the solum and from 15 to 50 percent in the substratum. Reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is loam or fine sandy loam.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. The lower part has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 4 to 6. This horizon is fine sandy loam, loam, or the gravelly analogs of those textures.

The 2C horizon has hue of 2.5Y or 5Y, value of 5 to 7, and chroma of 4 to 6. It is loamy sand, loamy fine sand, or loamy coarse sand.

Charlton Series

The Charlton series consists of very deep, well drained soils on uplands. These soils formed in glacial till derived mainly from schist, gneiss, and granitic material. Slopes range from 3 to 45 percent.

Charlton soils are similar to Paxton and Canton soils and in many areas are adjacent to Scituate and Montauk soils. Unlike Charlton soils, Paxton, Scituate, and Montauk soils have a dense substratum and Canton soils have contrasting textures.

Typical pedon of Charlton fine sandy loam, in a wooded area of Paxton-Charlton association, steep, extremely stony, 2,750 feet north of the Connecticut border, 50 feet west of Route 189, in the town of Granville:

Oi—3 to 1.5 inches; undecomposed oak and maple leaves.

Oe—1.5 inches to 0; humus; many fine roots.

Ap—0 to 8 inches; dark brown (10YR 3/3) fine sandy loam, pale brown (10YR 6/2) dry; weak medium granular structure; very friable; many fine and common medium roots; about 5 percent rock fragments; very strongly acid; clear wavy boundary.

Bw1—8 to 22 inches; gray (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable; few fine and coarse roots; about 5 percent rock fragments; strongly acid; clear smooth boundary.
Bw2—22 to 32 inches; light olive brown (2.5Y 5/6) fine sandy loam; weak medium subangular blocky structure; friable; about 10 percent rock fragments; strongly acid; clear smooth boundary.
C—32 to 65 inches; light olive brown (2.5Y 5/6) fine sandy loam; massive; friable; about 10 percent rock fragments; strongly acid.

The thickness of the solum ranges from 20 to 38 inches. The content of rock fragments ranges from 5 to 35 percent throughout the profile. Reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. It is loam, fine sandy loam, or sandy loam.

The upper part of the B horizon has hue of 7.5YR or 10YR and value and chroma of 4 to 6. The lower part has hue of 10YR or 2.5Y and value and chroma of 4 to 6. This horizon is sandy loam, fine sandy loam, or loam.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6. It is dominantly sandy loam, fine sandy loam, or loam but in some pedons has lenses of loamy sand.

Chatfield Series

The Chatfield series consists of moderately deep, well drained soils on uplands. These soils formed in acid glacial till over crystalline rocks. Slopes range from 3 to 45 percent.

Chatfield soils are similar to Hollis soils and in many areas are adjacent to Scituate, Woodbridge, Montauk, and Paxton soils. Unlike Chatfield soils, Hollis soils are shallow and Scituate, Woodbridge, Montauk, and Paxton soils have a dense substratum and are very deep.

Typical pedon of Chatfield fine sandy loam, in a wooded area of Hollis-Chatfield association, steep, extremely stony, about 2,750 feet north of the Connecticut border, 75 feet west of Route 189, in the town of Granville:

Oi—3 inches to 1 inch; undecomposed oak and maple leaves.
Oe—1 inch to 0; humus.
A—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; about 10 percent rock fragments; very strongly acid; clear smooth boundary.
Bw1—4 to 12 inches; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; about 15 percent rock fragments; strongly acid; gradual smooth boundary.
Bw2—12 to 20 inches; olive brown (2.5Y 4/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; few medium roots; about 20 percent rock fragments; strongly acid; clear smooth boundary.
C—20 to 27 inches; olive brown (2.5Y 4/4) gravelly sandy loam; massive; friable; few medium roots; about 20 percent rock fragments; very strongly acid; abrupt wavy boundary.
R—27 inches; schist bedrock.

The thickness of the solum ranges from 16 to 36 inches. The depth to bedrock ranges from 20 to 40 inches. In unlimed areas reaction is very strongly acid or strongly acid throughout the solum and substratum.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. It is loam to sandy loam. It has 5 to 10 percent gravel.

The B horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6. It is loam to sandy loam or the gravelly analogs of the textures within that range. It has 5 to 20 percent gravel.

The C horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 2 to 4. It is loam to sandy loam. It is friable or firm.

The R horizon is crystalline bedrock.

Hinckley Series

The Hinckley series consists of very deep, excessively drained soils on outwash plains, kames, and stream terraces. These soils formed in glacial outwash derived mainly from granite, gneiss, and schist. Slopes range from 0 to 45 percent.

Hinckley soils are similar to Windsor and Merrimac soils and in many areas are near Sudbury soils. Hinckley soils contain more gravel than Windsor soils and are coarser textured than Merrimac soils. Unlike Hinckley soils, Sudbury soils are mottled. They are in the lower, less convex areas.

Typical pedon of Hinckley very gravelly sandy loam, 3 to 8 percent slopes, in a field of hay, 75 feet east of Fairground Road, 2,000 feet south of the junction of Fairground Road and Mount Road, in the town of Cummington:

Ap—0 to 8 inches; black (10YR 2.5/1) very gravelly sandy loam; weak fine granular structure; friable; many fine roots; about 40 percent fine gravel; slightly acid; abrupt smooth boundary.

E—8 to 9 inches; grayish brown (10YR 5/2) very gravelly loamy sand; weak fine granular structure; friable; many fine roots; about 40 percent fine gravel; strongly acid; abrupt broken boundary.
Bw1—9 to 11 inches; dark reddish brown (7.5YR 3/4) very gravelly loamy sand; weak fine granular structure; very friable; many fine roots; about 45 percent fine gravel and 10 percent cobbles; strongly acid; clear smooth boundary.
Bw2—11 to 17 inches; reddish brown (7.5YR 5/8) very gravelly loamy sand; weak fine granular structure; very friable; many fine roots; about 45 percent fine gravel and 10 percent cobbles; moderately acid; abrupt smooth boundary.
C—17 to 65 inches; strong brown (7.5YR 5/8), stratified sand and gravel; single grain; loose; about 45 percent fine gravel and 15 percent cobbles; moderately acid.

The thickness of the solum ranges from 12 to 30 inches. In unlimed areas reaction is extremely acid to moderately acid throughout the profile.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is fine sandy loam, sandy loam, or the gravelly analogs of those textures. It has 10 to 45 percent gravel.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. The Bw1 horizon is fine sandy loam, sandy loam, loamy sand, or the gravelly analogs of those textures. It has 5 to 45 percent gravel. The Bw2 horizon is loamy sand to coarse sand or the gravelly analogs of the textures within that range. It has 10 to 50 percent gravel.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. It has 35 to 50 percent gravel and 5 to 15 percent cobbles.

Hollis Series

The Hollis series consists of shallow, somewhat excessively drained soils on uplands. These soils formed in a thin mantle of glacial till and fractured rock derived mainly from gneiss, schist, and granite. Slopes range from 3 to 45 percent.

Hollis soils are similar to Chatfield soils and in many areas are adjacent to Scituate, Woodbridge, Montauk, and Paxton soils. Unlike Hollis soils, Chatfield soils are moderately deep and Scituate, Woodbridge, Montauk, and Paxton soils are very deep and have a dense substratum.

Typical pedon of Hollis loam, in a wooded area of Hollis-Chatfield association, steep, extremely stony, in Huntington State Forest, the Knightville Dam area, 75 feet west of a gate on a road along a river, 7,800 feet south of Indian Hollow Camp Site, in the town of Huntington:

Oe—1 inch to 0; loose leaves and twigs and humus.
A—0 to 2 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; very friable; many fine and common medium roots; about 5 percent rock fragments; very strongly acid; clear smooth boundary.
Bw1—2 to 6 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; about 5 percent rock fragments; very strongly acid; clear wavy boundary.
Bw2—6 to 16 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; strongly acid; abrupt wavy boundary.
R—16 inches; schist bedrock.

The thickness of the solum ranges from 10 to 20 inches. It is the same as the depth to bedrock. In unlimed areas reaction is very strongly acid to moderately acid throughout the solum.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 3. It is loam or fine sandy loam. It has 5 to 15 percent rock fragments.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 8. It is fine sandy loam, loam, or the gravelly analogs of those textures. It has 5 to 15 percent rock fragments.

The R horizon is schist, gneiss, or granitic bedrock.

Lupton Series

The Lupton series consists of very deep, very poorly drained soils in depressions and drainageways. These soils formed in organic material more than 51 inches thick. Slopes range from 0 to 2 percent.

Lupton soils are similar to Wonsqueak and Palms soils and in many areas are adjacent to Pillsbury and Peacham soils. Lupton soils are deeper to a mineral horizon than Wonsqueak and Palms soils and have a thicker mantle of organic material than is characteristic of Peacham soils. Unlike Lupton soils, Pillsbury soils are poorly drained.

Typical pedon of Lupton muck, about 600 feet south of the intersection of Birch Hill Road and Cobble Mountain Road, 200 feet west of Cobble Mountain Road, in the town of Blandford:

Oa1—0 to 20 inches; sapric material, black (10YR 2/1) broken face and rubbed; about 35 percent fiber, 5 percent rubbed; massive; about 10 percent mineral

material; many fine and very fine roots; very strongly acid; clear smooth boundary.

Oa2—20 to 29 inches; sapric material, dark reddish brown (5YR 3/2) broken face, black (5YR 2/1) rubbed; about 35 percent fiber, 5 percent rubbed; massive; about 10 percent mineral material; few fine and very fine roots; very strongly acid; clear smooth boundary.

Oa3—29 to 44 inches; sapric material, dark brown (7.5YR 3/2) broken face, dark reddish brown (5YR 3/2) rubbed; dark grayish brown (10YR 4/2) streaks throughout; about 45 percent fiber, 5 percent rubbed; massive; about 30 percent mineral material; few very fine roots; very strongly acid; clear smooth boundary.

Oa4—44 to 55 inches; sapric material, dark reddish brown (5YR 2/2) broken face, black (5YR 2/1) rubbed; about 35 percent fiber, 10 percent rubbed; massive; about 20 percent mineral material; very strongly acid; abrupt smooth boundary.

Oi—55 to 65 inches; hemic material, about 70 percent black (10YR 2/1) and 30 percent dark reddish brown (5YR 3/2) broken face, dark reddish brown (5YR 2/2) rubbed; about 80 percent fiber, 60 percent rubbed; massive; about 10 percent mineral material; very strongly acid.

The organic material is more than 51 inches thick. Reaction is very strongly acid to slightly acid in 0.1M calcium chloride.

The organic material has hue of 10YR, 7.5YR, or 5YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. The surface tier is primarily sapric material but has some hemic or fibric material. The subsurface and bottom tiers are generally sapric material but have layers of hemic material that have a combined thickness of less than 10 inches. The bottom tier has varying amounts of woody and herbaceous fiber.

Lyman Series

The Lyman series consists of shallow, somewhat excessively drained soils on uplands. These soils formed in a thin mantle of glacial till and fractured rock derived mainly from gray, greenish gray, or nearly black mica schist. Slopes range from 3 to 45 percent.

Lyman soils are similar to Tunbridge soils and in many areas are adjacent to Peru and Marlow soils. Unlike Lyman soils, Tunbridge soils are moderately deep and Peru and Marlow soils have a dense substratum and are very deep. Lyman soils are slightly higher on the landscape than Tunbridge soils.

Typical pedon of Lyman loam, in a wooded area of Tunbridge-Lyman complex, 8 to 15 percent slopes, 150 feet west of a fire tower in the Daughters of the American Revolution (DAR) State Forest, in the town of Goshen:

A—0 to 1 inch; black (5YR 2.5/1) loam; weak fine granular structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.

E—1 to 3 inches; gray (7.5YR 5/1) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; very strongly acid; clear wavy boundary.

Bhs—3 to 7 inches; dark reddish brown (5YR 3/3) loam; weak fine granular structure; friable; many fine and medium roots; about 5 percent rock fragments; very strongly acid; gradual broken boundary.

Bs—7 to 11 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; friable; common medium and few fine roots; about 10 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw1—11 to 15 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine subangular blocky structure; friable; few fine and medium roots; about 10 percent rock fragments; very strongly acid; clear smooth boundary.

Bw2—15 to 19 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; few fine and medium roots; about 10 percent rock fragments; strongly acid; abrupt wavy boundary.

R—19 inches; schist bedrock.

The thickness of the solum ranges from 10 to 20 inches. It is the same as the depth to bedrock. In unlimed areas reaction is very strongly acid or strongly acid throughout the solum.

The A horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. It is loam or fine sandy loam. It has 5 to 15 percent rock fragments.

The Bh horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 2 to 6. The Bs horizon has hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 3 to 8. The Bw horizon has hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 3 or 4. The B horizon is fine sandy loam, loam, or the gravelly analogs of those textures. It has 5 to 15 percent rock fragments.

The R horizon is schist, gneiss, or granitic bedrock.

Marlow Series

The Marlow series consists of very deep, well drained soils on uplands. These soils formed in glacial till derived mainly from granite, gneiss, and schist. Slopes range from 3 to 45 percent.

Marlow soils are similar to Berkshire soils and in many areas are adjacent to Peru and Tunbridge soils.

Unlike Marlow soils, Berkshire soils do not have a dense substratum, Peru soils are mottled, and Tunbridge soils are moderately deep.

Typical pedon of Marlow loam, 3 to 8 percent slopes, on a road cut on the north side of Packard Road, 1,300 feet from the junction of Packard Road and Route 9, in the town of Cummington:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; friable; few to many coarse roots; about 5 percent rock fragments; very strongly acid; clear smooth boundary.

Bh—2 to 6 inches; dark brown (10YR 4/3) loam; weak fine granular structure; friable; few to many coarse roots; about 20 percent rock fragments; very strongly acid; clear smooth boundary.

Bs—6 to 14 inches; yellowish red (5YR 4/6) loam; weak fine granular structure; friable; few fine and medium roots; about 20 percent rock fragments; strongly acid; clear smooth boundary.

Bw—14 to 24 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine granular structure; friable; common fine roots; about 10 percent rock fragments; strongly acid; abrupt wavy boundary.

Cd1—24 to 28 inches; olive (5Y 4/3) gravelly fine sandy loam; moderate thin platy structure; firm; about 20 percent rock fragments; strongly acid; clear smooth boundary.

Cd2—28 to 65 inches; dark grayish brown (2.5Y 4/2) gravelly fine sandy loam; moderate thin and thick platy structure; firm; about 20 percent rock fragments; strongly acid.

Depth to the dense substratum ranges from 22 to 30 inches. The content of rock fragments ranges from 5 to 20 percent throughout the profile. Reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 4. It is loam or fine sandy loam.

The Bh or Bhs horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 3. It is as much as 4 inches thick. The Bs horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 8. The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. It is fine sandy loam or loam.

The Cd horizon has hue of 2.5Y or 5Y, value of 3 to 5, and chroma of 1 to 4. It is firm or very firm. It is fine sandy loam, loam, or the gravelly analogs of those textures.

Merrimac Series

The Merrimac series consists of very deep, somewhat excessively drained soils on outwash plains, kames, and stream terraces. These soils formed in glacial outwash derived mainly from granite, gneiss, and schist. Slopes range from 0 to 25 percent.

Merrimac soils are similar to Hinckley and Windsor soils and in many areas are near Sudbury soils. Merrimac soils are finer textured than Hinckley soils and have more gravel than Windsor soils. Unlike Merrimac soils, Sudbury soils are mottled. They are in the lower, less convex areas.

Typical pedon of Merrimac fine sandy loam, 8 to 15 percent slopes, in a wooded area, 50 feet east of Granville Cemetery, by the caretaker's shack, in the town of Granville:

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; few fine roots; about 5 percent gravel; very strongly acid; clear smooth boundary.

Bw—9 to 26 inches; yellowish brown (10YR 5/8) gravelly sandy loam; weak fine subangular blocky structure; very friable; few medium roots; about 15 percent gravel; strongly acid; clear smooth boundary.

2Bw—26 to 33 inches; yellowish brown (10YR 5/6) gravelly loamy sand; massive; very friable; few fine roots; about 25 percent gravel; very strongly acid; clear smooth boundary.

2C—33 to 65 inches; light yellowish brown (10YR 6/4) very gravelly sand; single grain; loose; about 35 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 18 to 33 inches. In unlimed areas reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is fine sandy loam, sandy loam, or the gravelly analogs of those textures. It has 5 to 20 percent gravel.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 3 to 8. The upper part of this horizon is sandy loam, fine sandy loam, or the gravelly analogs of those textures. It has 5 to 20 percent gravel. The lower part is sandy loam, loamy sand, or the gravelly analogs of those textures. It has 5 to 30 percent gravel.

The 2C horizon has hue of 10YR to 5Y. It has 25 to 55 percent gravel.

Millsite Series

The Millsite series consists of moderately deep, well drained soils on uplands. These soils formed in acid glacial till over crystalline rocks. Slopes range from 3 to 45 percent.

Millsite soils are similar to Westminster soils and in

many areas are adjacent to Ashfield and Shelburne soils. Unlike Millsite soils, Westminster soils are shallow and Ashfield and Shelburne soils have a dense substratum and are very deep.

Typical pedon of Millsite loam, in an area of Millsite-Westminster-Rock outcrop complex, 8 to 15 percent slopes, in an idle field south of Route 66, about 200 feet south of a house foundation at the top of Fisher Hill, in the town of Westhampton:

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; friable; many fine and common medium roots; about 5 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw1—6 to 13 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; common fine roots; about 10 percent rock fragments; very strongly acid; clear wavy boundary.

Bw2—13 to 20 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine granular structure; friable; few fine roots; about 10 percent rock fragments; very strongly acid; clear wavy boundary.

Bw3—20 to 35 inches; olive brown (2.5Y 4/4) gravelly fine sandy loam; weak fine granular structure; friable; very few fine roots; about 15 percent rock fragments; strongly acid; abrupt wavy boundary.

R—35 inches; schist bedrock.

The thickness of the solum ranges from 16 to 36 inches. The depth to bedrock ranges from 20 to 40 inches. In unlimed areas reaction is very strongly acid to slightly acid throughout the solum.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. It is loam to sandy loam. It has 5 to 10 percent gravel.

The B horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6. It is loam, fine sandy loam, or the gravelly analogs of those textures. It has 5 to 20 percent gravel.

The R horizon is crystalline bedrock.

Montauk Series

The Montauk series consists of very deep, well drained soils on uplands. These soils formed in glacial till derived mainly from granitic material. Slopes range from 3 to 45 percent.

Montauk soils are similar to Shelburne soils and in many areas are adjacent to Scituate and Chatfield soils. Montauk soils are more sandy in the substratum than Shelburne soils and are in a warmer temperature regime. Unlike Montauk soils, Scituate soils are mottled and Chatfield soils are moderately deep.

Typical pedon of Montauk fine sandy loam, 3 to 8 percent slopes, in a wooded area, 50 feet south of Laurel Hill Road, 1,500 feet east of the junction of Laurel Hill Road and Edwards Road, in the town of Westhampton:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; many fine and common medium roots; about 3 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw1—7 to 16 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; common fine and few medium roots; about 10 percent rock fragments less than 3 inches in size and 2 percent more than 3 inches; very strongly acid; clear wavy boundary.

Bw2—16 to 24 inches; olive brown (2.5Y 4/4) fine sandy loam, pale yellow (2.5Y 7/4) dry; massive; very friable; few fine and common medium roots; about 10 percent rock fragments less than 3 inches in size and 2 percent more than 3 inches; very strongly acid; clear smooth boundary.

Cd—24 to 65 inches; olive (5Y 5/3) loamy sand that has lenses of loamy fine sand; few medium distinct light olive gray (5Y 6/2) mottles in the upper part; strong medium platy structure; very firm; about 10 percent rock fragments less than 3 inches in size and 2 percent more than 3 inches; very strongly acid.

Depth to the dense substratum ranges from 18 to 38 inches. The content of rock fragments ranges from 3 to 30 percent throughout the profile. Reaction is extremely acid to moderately acid throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 1 to 4. It is loam or fine sandy loam.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. The lower part has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. This horizon is fine sandy loam or loam.

The Cd horizon has hue of 5YR to 5Y, value of 4 to 6, and chroma of 1 to 6. It is firm or very firm. It is fine sandy loam to coarse sand or the gravelly analogs of the textures within that range.

Palms Series

The Palms series consists of very deep, very poorly drained soils in depressions and drainageways. These soils formed in organic material about 16 to 51 inches thick. Slopes range from 0 to 2 percent.

Palms soils are similar to Lupton and Wonsqueak

soils and in many areas are adjacent to Ridgebury and Whitman soils. Palms soils are shallower to a mineral horizon than Lupton soils, are warmer than Wonsqueak soils, and have a thicker mantle of organic material than is characteristic of Whitman soils. Unlike Palms soils, Ridgebury soils are poorly drained.

Typical pedon of Palms muck, in an area of Ridgebury-Whitman-Palms association, undulating, extremely stony, about 1,750 feet south of the intersection of General Knox Road and South Quarter Road, 250 feet west of South Quarter Road, in the town of Russell:

Oa1—0 to 11 inches; sapric material, dark reddish brown (5YR 2/2) broken face and rubbed; about 50 percent fiber, 5 percent rubbed; massive; about 10 percent mineral material; many fine and very fine roots; strongly acid; clear smooth boundary.

Oa2—11 to 21 inches; sapric material, dark reddish brown (5YR 2/2) broken face and rubbed; about 45 percent fiber, 10 percent rubbed; massive; about 10 percent mineral material; many fine and very fine roots; strongly acid; clear smooth boundary.

Oa3—21 to 30 inches; sapric material, dark reddish brown (5YR 3/2) broken face and rubbed; about 35 percent fiber, 5 percent rubbed; massive; about 15 percent mineral material; strongly acid; abrupt smooth boundary.

Oa4—30 to 47 inches; sapric material, dark brown (7.5YR 3/2) broken face and rubbed; about 30 percent fiber, 5 percent rubbed; massive; about 30 percent mineral material; strongly acid; abrupt smooth boundary.

2C—47 to 65 inches; black (5Y 3/1) sandy loam; massive; firm; about 5 percent rock fragments; neutral.

The organic material ranges from more than 16 inches to less than 51 inches in thickness. Reaction is very strongly acid to neutral in 0.1M calcium chloride.

The surface tier has hue of 10YR, 7.5YR, or 5YR or is neutral in hue. It has value of 2 and chroma of 0 to 2. It is primarily sapric material but has some hemic or fibric material.

The subsurface and bottom tiers have hue of 10YR, 7.5YR, or 5YR or are neutral in hue. They have value of 2 to 4 and chroma of 0 to 3. They are generally sapric material but have layers of hemic material that have a combined thickness of less than 10 inches or layers of fibric material that have a combined thickness of less than 5 inches.

The 2C horizon is neutral in hue or has hue of 10YR, 2.5YR, or 5Y, value of 3 to 7, and chroma of 1 or 2. It is silt loam, loam, fine sandy loam, or sandy loam. It has 0 to 20 percent rock fragments.

Paxton Series

The Paxton series consists of very deep, well drained soils on uplands. These soils formed in acid glacial till derived mainly from schist, gneiss, and granite. Slopes range from 0 to 45 percent.

Paxton soils are similar to Charlton soils and in many areas are adjacent to Woodbridge and Ridgebury soils. Unlike Paxton soils, Charlton soils do not have a dense substratum and Woodbridge and Ridgebury soils are mottled.

Typical pedon of Paxton fine sandy loam, in a wooded area of Paxton-Charlton association, steep, extremely stony, 700 feet east of the Westfield River, 4,000 feet north of the Knightville Dam office building, in the town of Huntington:

Oi—3 to 2 inches; loose leaves and twigs.

Oe—2 inches to 1 inch; partially decomposed organic material.

Oa—1 inch to 0; highly decomposed organic material.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; about 5 percent rock fragments; very strongly acid; clear smooth boundary.

Bw1—2 to 5 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; about 5 percent rock fragments; very strongly acid; clear wavy boundary.

Bw2—5 to 18 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; about 5 percent rock fragments; very strongly acid; abrupt wavy boundary.

Cd—18 to 65 inches; olive (5Y 4/3) fine sandy loam; massive; very firm; about 5 percent rock fragments; strongly acid.

Depth to the dense substratum ranges from 18 to 38 inches. The content of rock fragments ranges from about 5 to 30 percent throughout the profile. Reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is loam or fine sandy loam.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. The lower part has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. This horizon is loam, fine sandy loam, or sandy loam.

The Cd horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 2 to 4. It is firm or very firm. It is

sandy loam, fine sandy loam, loam, or the gravelly analogs of those textures.

Peacham Series

The Peacham series consists of very deep, very poorly drained soils on uplands. These soils formed in organic material less than 16 inches thick and in glacial till derived mainly from granite, gneiss, and schist. Slopes range from 0 to 5 percent.

Peacham soils are similar to Whitman soils and in many areas are adjacent to Pillsbury and Peru soils. Peacham soils have a colder temperature regime than Whitman soils and have a subsoil that is grayer than that of Pillsbury and Peru soils.

Typical pedon of Peacham muck, in an area of Pillsbury-Peacham-Wonsqueak association, undulating, extremely stony, 100 feet south of Route 23, about 4,250 feet east of the junction of Sheppard Road and Route 23, in the town of Blandford:

Oa—0 to 9 inches; sapric material, black (5YR 2.5/1) broken face and rubbed; weak medium granular structure; friable; many fine and common medium roots; neutral; abrupt smooth boundary.

Bg—9 to 15 inches; grayish brown (2.5Y 5/2) fine sandy loam; common medium distinct gray (N 5/0) and many medium prominent light olive brown (2.5Y 5/4) mottles; moderate coarse angular blocky structure; firm; few fine roots; about 8 percent rock fragments; neutral; clear smooth boundary.

Cdg—15 to 65 inches; olive gray (5Y 5/2) fine sandy loam; many medium faint gray (5Y 5/1) and common medium prominent strong brown (7.5YR 5/8) mottles; massive; firm; about 5 percent rock fragments; neutral.

Depth to the dense substratum ranges from 2 to 24 inches. The content of rock fragments ranges from 5 to 30 percent in the mineral horizons. Reaction is very strongly acid to neutral throughout the profile.

The Oa horizon has hue of 5YR to 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The content of fiber is less than 15 percent after rubbing.

Some pedons have an A horizon. This horizon has hue of 10YR to 5Y, value of 2 to 4, and chroma of 1 or 2. It is fine sandy loam, loam, silt loam, or the mucky or gravelly analogs of those textures.

The Bg horizon has hue of 10YR to 5GY, value of 4 to 6, and chroma of 1 or 2. It is sandy loam to silt loam or the gravelly analogs of the textures within that range.

The Cdg horizon has hue of 2.5Y to 5GY, value of 3 to 6, and chroma of 1 or 2. It is sandy loam to silt loam or the gravelly analogs of the textures within that range.

Peru Series

The Peru series consists of very deep, moderately well drained soils on uplands. These soils formed in glacial till derived mainly from granite, gneiss, and schist. Slopes range from 0 to 15 percent.

Peru soils are similar to Ashfield soils and in many areas are adjacent to Pillsbury and Marlow soils. Unlike Peru soils, Ashfield soils do not have a spodic horizon, Pillsbury soils have gray mottles, and Marlow soils are not mottled.

Typical pedon of Peru loam, 0 to 3 percent slopes, in a wooded area, 75 feet south of Bashan Hill Road, 1,100 feet northwest of the junction of Bashan Hill Road and Route 143, in the town of Worthington:

Oi—2 inches to 0; loose leaves and twigs.

A—0 to 3 inches; dark brown (7.5YR 3/2) loam; weak fine granular structure; friable; many fine and medium roots; about 5 percent rock fragments; strongly acid; clear smooth boundary.

Bs—3 to 11 inches; dark brown (10YR 4/3) loam; few fine and medium distinct yellowish red (5YR 5/8) mottles; weak fine granular structure; friable; many fine and medium roots; about 10 percent rock fragments; strongly acid; clear smooth boundary.

Bw—11 to 17 inches; brown (10YR 4/3) fine sandy loam; common fine and medium distinct yellowish red (5YR 5/8) and very dark grayish brown (10YR 3/2) mottles; massive; friable; few fine roots; about 10 percent rock fragments; very strongly acid; clear smooth boundary.

Cd—17 to 65 inches; grayish brown (5Y 5/2) gravelly fine sandy loam; many fine and medium yellowish red (5YR 5/8) and common fine and medium light gray (10YR 7/2) mottles; moderate thin and thick platy structure; very firm; about 15 percent rock fragments; very strongly acid.

Depth to the dense substratum ranges from 17 to 30 inches. The solum and substratum are fine sandy loam, loam, or the gravelly analogs of those textures. The content of rock fragments ranges from 5 to 25 percent throughout the profile. Reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 2 or 3.

Some pedons have a Bh or Bhs horizon, which has hue of 2.5YR to 10YR, value of 2 or 3, and chroma of 1 to 3. The Bs horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 8. The Bw horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 2 to 6.

The Cd horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 2 to 4. It is firm or very firm and is brittle.

Pillsbury Series

The Pillsbury series consists of very deep, poorly drained soils on uplands. These soils formed in glacial till derived mainly from granite, gneiss, and schist. Slopes range from 0 to 8 percent.

Pillsbury soils are similar to Ridgebury soils and in many areas are adjacent to Peru and Marlow soils. Pillsbury soils have a colder temperature regime than Ridgebury soils and have a subsoil that is grayer than that of Peru soils. Unlike Pillsbury soils, Marlow soils are not mottled.

Typical pedon of Pillsbury loam, in an area of Pillsbury-Peacham-Wonsqueak association, undulating, extremely stony, 2,500 feet northeast of Worthington Corners, 500 feet northwest of Routes 112 and 143, in the town of Worthington:

A—0 to 5 inches; very dark grayish brown (2.5Y 3/2) loam; weak fine granular structure; friable; many fine and common medium roots; about 5 percent rock fragments; moderately acid; clear smooth boundary.

Bg1—5 to 11 inches; olive gray (5Y 4/2) fine sandy loam; common fine prominent yellowish red (5YR 4/8) and common fine faint gray (5Y 5/1) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; about 5 percent rock fragments; moderately acid; clear smooth boundary.

Bg2—11 to 19 inches; dark gray (5Y 4/1) fine sandy loam; common medium distinct gray (N 5/0) mottles; moderate coarse subangular blocky structure parting to moderate medium platy; firm; about 5 percent rock fragments; moderately acid; clear smooth boundary.

Cd—19 to 65 inches; dark gray (2.5Y 4/1) fine sandy loam; many fine prominent yellowish red (5YR 4/8) and light gray (10YR 6/1) mottles; moderate medium platy structure; very firm; about 5 percent rock fragments; moderately acid.

Depth to the dense substratum ranges from 15 to 25 inches. The solum and substratum are sandy loam, fine sandy loam, loam, or the gravelly analogs of those textures. The content of rock fragments ranges from 5 to 35 percent throughout the profile. Reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 10YR or 5Y, value of 2 or 3, and chroma of 1 to 3.

The B horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 4. It is mottled. It has granular, subangular blocky, or platy structure.

The Cd horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 4.

Pootatuck Series

The Pootatuck series consists of very deep, moderately well drained soils on flood plains. These soils formed in alluvial deposits. Slopes range from 0 to 3 percent.

Pootatuck soils are similar to Sudbury soils and in many areas are near Rippowam soils. Pootatuck soils have a lower content of gravel than Sudbury soils. Unlike Sudbury soils, they are subject to flooding. Unlike Pootatuck soils, Rippowam soils are poorly drained and are in the lower, less convex areas.

Typical pedon of Pootatuck fine sandy loam, in a field of hay, 2,200 feet south of Route 57, about 100 feet east of Route 189, in the town of Granville:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak medium and coarse granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Bw—9 to 20 inches; yellowish brown (10YR 5/4) fine sandy loam; common fine distinct yellowish red (5YR 5/8) mottles throughout the horizon and many fine faint light brownish gray (2.5Y 6/2) mottles in the lower part; weak medium subangular blocky structure; friable; about 3 percent rock fragments; many mica flakes throughout; few fine roots; neutral; clear smooth boundary.

C1—20 to 27 inches; pale olive (5Y 6/3) loamy sand that has lenses of coarse sand; common fine prominent yellowish red (5YR 5/8) mottles; massive; friable; about 15 percent cobbles; neutral; abrupt smooth boundary.

C2—27 to 65 inches; olive brown (2.5Y 4/4) gravelly loamy coarse sand; single grain; loose; about 40 percent rock fragments; strongly acid.

The thickness of the solum ranges from 20 to 40 inches. In unlimed areas reaction is very strongly acid to slightly acid throughout the profile.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is fine sandy loam or sandy loam.

The Bw horizon has hue of 10YR to 5Y and value and chroma of 3 to 6. It is fine sandy loam or sandy loam.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 6. It is dominantly loamy fine sand to coarse sand but in some pedons has thin strata that are extremely gravelly.

Ridgebury Series

The Ridgebury series consists of very deep, poorly drained soils on uplands. These soils formed in glacial till derived mainly from granite, gneiss, and schist. Slopes range from 0 to 8 percent.

Ridgebury soils are similar to Pillsbury soils and in many areas are adjacent to Montauk, Paxton, Scituate, and Woodbridge soils. Ridgebury soils have a warmer temperature regime than Pillsbury soils and have a subsoil that is grayer than that of Scituate and Woodbridge soils. Unlike Ridgebury soils, Montauk and Paxton soils are not mottled.

Typical pedon of Ridgebury fine sandy loam, in an area of Ridgebury-Whitman-Palms association, undulating, extremely stony, 1,500 feet east of Silver Street, 100 feet south of Cross Lane, in the town of Granville:

Oe—3 inches to 0; loose leaves and twigs.

Ap—0 to 7 inches; black (10YR 2/1) fine sandy loam; weak fine granular structure; very friable; many fine and common medium roots; about 10 percent rock fragments; strongly acid; abrupt smooth boundary.

Bg—7 to 20 inches; olive gray (5Y 5/2) gravelly fine sandy loam; common medium prominent strong brown (7.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; about 20 percent rock fragments; moderately acid; clear smooth boundary.

BC—20 to 24 inches; yellowish brown (10YR 5/4) gravelly sandy loam that has lenses of coarse sand; many medium distinct strong brown (7.5YR 5/8) and common medium prominent gray (N 6/0) mottles; weak fine subangular blocky structure; firm; about 20 percent rock fragments; moderately acid; clear smooth boundary.

Cd—24 to 65 inches; light olive brown (2.5Y 5/4) gravelly sandy loam that has lenses of coarse sand; common fine prominent strong brown (7.5YR 5/8) mottles; massive; very firm; about 20 percent rock fragments; moderately acid.

Depth to the dense substratum ranges from 15 to 30 inches. The solum and substratum are sandy loam, fine sandy loam, loam, or the gravelly analogs of those textures. The content of rock fragments ranges from 5 to 35 percent throughout the profile. Reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 10YR to 5Y, value of 2 or 3, and chroma of 1 or 2.

The B horizon has hue of 7.5YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 3. It is mottled. It has subangular blocky or platy structure or is massive.

The Cd horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 4. It is firm or very firm and is brittle.

Rippowam Series

The Rippowam series consists of very deep, poorly drained soils on flood plains. These soils formed in loamy alluvial deposits. Slopes range from 0 to 3 percent.

Rippowam soils are similar to Walpole soils and in many areas are near Pootatuck soils. Rippowam soils have a lower content of gravel than Walpole soils. Unlike Walpole soils, they are subject to flooding. Unlike Rippowam soils, Pootatuck soils are moderately well drained.

Typical pedon of Rippowam very fine sandy loam, in a field of hay, 2,200 feet south of Route 57, about 500 feet west of Route 189, in the town of Granville:

Ap—0 to 10 inches; very dark gray (10YR 3/1) very fine sandy loam, light brownish gray (10YR 6/2) dry; common fine distinct yellowish red (5YR 5/8) mottles; weak medium granular structure; friable; many fine roots; moderately acid; clear smooth boundary.

Cg1—10 to 16 inches; grayish brown (2.5Y 5/2) fine sandy loam; few medium distinct yellowish red (5YR 5/8) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; moderately acid; clear smooth boundary.

Cg2—16 to 21 inches; grayish brown (2.5Y 5/2) sandy loam; few medium distinct yellowish red (5YR 5/8) mottles; massive; friable; moderately acid; abrupt smooth boundary.

Ab—21 to 28 inches; very dark grayish brown (10YR 3/2) sandy loam; massive; friable; common partially decomposed sticks (0.25 to 1 inch in diameter) and grasses; strongly acid; clear smooth boundary.

2C1—28 to 33 inches; gray (5Y 5/1) sand; single grain; loose; moderately acid; abrupt smooth boundary.

2C2—33 to 65 inches; brown (10YR 5/3) coarse sand and gravel; single grain; loose; about 20 percent cobbles; strongly acid.

Depth to the coarse textured substratum ranges from 20 to 40 inches. The content of gravel ranges from 0 to 15 percent in the upper part of the substratum and from 0 to 40 percent in the lower part. In unlimed areas reaction is very strongly acid to neutral throughout the profile.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. It is very fine sandy loam, fine sandy loam, or sandy loam.

The C horizon has hue of 10YR to 5Y, value of 3 to

6, and chroma of 1 to 3. It is fine sandy loam or sandy loam in the upper part and loamy fine sand to coarse sand at a depth of 20 to 40 inches.

Scituate Series

The Scituate series consists of very deep, moderately well drained soils on uplands. These soils formed in loamy glacial till derived mainly from granite, gneiss, and schist. Slopes range from 3 to 25 percent.

Scituate soils are similar to Woodbridge soils and in many areas are adjacent to Montauk and Ridgebury soils. Scituate soils are coarser textured than Woodbridge soils. Unlike Scituate soils, Montauk soils are not mottled. Ridgebury soils have a subsoil that is grayer than that of Scituate soils.

Typical pedon of Scituate fine sandy loam, 3 to 8 percent slopes, in a field of hay, 750 feet north of the Connecticut border, 100 feet east of Silver Street, in the town of Granville:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine and medium subangular blocky structure; friable; common fine roots; about 10 percent rock fragments; strongly acid; clear smooth boundary.

Bw1—10 to 19 inches; yellowish brown (10YR 5/6) gravelly fine sandy loam; weak medium and coarse subangular blocky structure; friable; common fine roots; about 15 percent rock fragments; strongly acid; clear smooth boundary.

Bw2—19 to 23 inches; light olive brown (2.5Y 5/4) gravelly sandy loam; common fine and medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm; few fine roots; about 15 percent rock fragments; moderately acid; abrupt smooth boundary.

Cd1—23 to 30 inches; light brownish gray (2.5Y 6/2) gravelly sandy loam that has lenses of fine sand; many fine and medium yellowish red (5YR 5/8) mottles; massive; firm in place, friable in hand; about 25 percent rock fragments; moderately acid; clear smooth boundary.

Cd2—30 to 65 inches; olive gray (5Y 5/2) gravelly loamy sand that has common lenses of coarse sand about 1 inch thick; few coarse prominent strong brown (7.5YR 5/8) mottles; massive; firm in place, friable in hand; about 25 percent rock fragments; moderately acid.

Depth to the dense substratum ranges from 18 to 34 inches. The solum is fine sandy loam, loam, or the gravelly analogs of those textures. The content of rock fragments ranges from 5 to 25 percent in the solum and is as much as 35 percent in the Cd horizon. Reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2.

The upper part of the B horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 4 to 6. The lower part has hue of 10YR to 5Y and value and chroma of 4 to 6.

The Cd horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It is firm or very firm and is brittle.

Shelburne Series

The Shelburne series consists of very deep, well drained soils on uplands. These soils formed in glacial till derived mainly from micaceous schist. Slopes range from 3 to 45 percent.

Shelburne soils are similar to Montauk and Canton soils and in many areas are adjacent to Ashfield and Pillsbury soils. Shelburne soils have a colder temperature regime and a finer textured substratum than Montauk and Canton soils. Unlike Shelburne soils, Canton soils do not have a dense substratum and Ashfield and Pillsbury soils are mottled.

Typical pedon of Shelburne loam, 3 to 8 percent slopes, in a wooded area, 0.5 mile south of the junction of Fuller Road and Willcutt Road, 115 feet west of Willcutt Road (Loomis Road off Route 9), in the town of Chesterfield:

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; friable; many fine and common medium roots; about 5 percent rock fragments less than 3 inches in size and 2 percent more than 3 inches; very strongly acid; abrupt smooth boundary.

Bw1—6 to 9 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; common fine and medium roots; about 5 percent rock fragments less than 3 inches in size and 2 percent more than 3 inches; strongly acid; clear wavy boundary.

Bw2—9 to 14 inches; olive brown (2.5Y 4/4) fine sandy loam; weak fine and medium subangular blocky structure; friable; common fine and medium roots; about 10 percent rock fragments less than 3 inches in size and 2 percent more than 3 inches; strongly acid; clear wavy boundary.

Bw3—14 to 19 inches; dark grayish brown (2.5Y 4/2) fine sandy loam; weak fine and medium subangular blocky structure; friable; very few fine and medium roots; about 10 percent rock fragments less than 3 inches in size and 2 percent more than 3 inches;

strongly acid; clear smooth boundary.

Cd—19 to 65 inches; olive (5Y 4/3) fine sandy loam; moderate thin platy structure; firm in place; about 10 percent rock fragments less than 3 inches in size and 2 percent more than 3 inches; moderately acid.

Depth to the dense substratum ranges from 16 to 30 inches. The content of rock fragments ranges from about 5 to 20 percent throughout the profile. In unlimed areas reaction is very strongly acid to moderately acid throughout the profile.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. It is loam or fine sandy loam.

The Bw horizon has hue of 10YR to 5Y, value of 3 or 4, and chroma of 2 to 4. It is loam or fine sandy loam.

The Cd horizon has hue of 2.5Y or 5Y, value of 3 or 4, and chroma of 2 to 4. It is firm or very firm. It is fine sandy loam, loam, or the gravelly analogs of those textures.

Sudbury Series

The Sudbury series consists of very deep, moderately well drained soils on outwash plains, kames, and stream terraces. These soils formed in glacial outwash derived mainly from granite, gneiss, and schist. Slopes range from 0 to 8 percent.

Sudbury soils are similar to Pootatuck soils and in many areas are near Hinckley, Merrimac, and Windsor soils. Sudbury soils contain more gravel than Pootatuck soils. Unlike Pootatuck soils, they are not subject to flooding. Unlike Sudbury soils, Hinckley, Merrimac, and Windsor soils do not have mottles.

Typical pedon of Sudbury fine sandy loam, 0 to 3 percent slopes, in an idle field, 50 feet south and 75 feet west of the intersection of Westfield Road and Winchell Road, in the town of Granville:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; few medium roots; about 5 percent gravel; very strongly acid; abrupt smooth boundary.

Bw1—7 to 15 inches; dark brown (7.5YR 4/4) gravelly fine sandy loam; weak medium subangular blocky structure; friable; many medium roots; about 25 percent gravel; strongly acid; clear wavy boundary.

Bw2—15 to 25 inches; brown (7.5YR 4/4) very gravelly fine sandy loam; few medium faint brown (7.5YR 4/2) mottles; single grain; very friable; few fine roots; about 45 percent gravel; strongly acid; clear smooth boundary.

C—25 to 65 inches; dark grayish brown (10YR 4/2) coarse sand and gravel; single grain; loose; strongly acid.

The thickness of the solum ranges from 18 to 36 inches. In unlimed areas reaction is very strongly acid to slightly acid throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It is fine sandy loam, very fine sandy loam, or the gravelly analogs of those textures. It has 0 to 25 percent gravel.

The B horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 3 to 8. It is sandy loam, fine sandy loam, or the gravelly analogs of those textures. It has 0 to 25 percent gravel.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. It has 25 to 60 percent gravel.

Tunbridge Series

The Tunbridge series consists of moderately deep, well drained soils on uplands. These soils formed in acid glacial till derived mainly from gray, greenish gray, or nearly black mica schist. Slopes range from 3 to 45 percent.

Tunbridge soils are similar to Lyman soils and in many areas are adjacent to Peru and Marlow soils. Unlike Tunbridge soils, Lyman soils are shallow and Peru and Marlow soils have a dense substratum and are very deep.

Typical pedon of Tunbridge loam, in a wooded area of Tunbridge-Lyman complex, 8 to 15 percent slopes, 75 feet west of Route 112 and 250 feet north of the junction of Routes 112 and 143, in the town of Worthington:

Oi—3 inches to 0; leaves and twigs.

A—0 to 3 inches; black (5YR 2/1) loam; weak fine granular structure; friable; many fine to coarse roots; very strongly acid; clear smooth boundary.

E—3 to 6 inches; light gray (5YR 6/1) fine sandy loam; weak fine granular structure; friable; many fine to coarse roots; very strongly acid; clear wavy boundary.

Bs1—6 to 8 inches; reddish brown (5YR 4/4) loam; weak fine granular structure; friable; many fine and medium roots; about 5 percent rock fragments; strongly acid; clear smooth boundary.

Bs2—8 to 14 inches; strong brown (7.5YR 5/6) loam; weak fine granular structure; friable; common fine and medium roots; about 5 percent rock fragments; strongly acid; clear smooth boundary.

Bw—14 to 24 inches; dark brown (7.5YR 4/4) loam; weak fine and medium subangular blocky structure parting to fine granular; friable; common fine and medium roots; about 5 percent rock fragments; strongly acid; abrupt wavy boundary.

R—24 inches; schist bedrock.

The thickness of the solum ranges from 20 to 38 inches. It is the same as the depth to bedrock. In unlimed areas reaction is very strongly acid or strongly acid throughout the solum.

The A horizon has hue of 5YR to 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. It is loam or fine sandy loam. It has 0 to 5 percent rock fragments.

The E horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 1 or 2. It is loam or fine sandy loam.

The Bs horizon has hue of 5YR or 7.5YR and value and chroma of 4 to 6. The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The B horizon has 5 to 10 percent rock fragments.

The R horizon is schist, gneiss, or granitic bedrock.

Walpole Series

The Walpole series consists of very deep, poorly drained soils on low outwash plains and stream terraces. These soils formed in sandy glacial outwash derived mainly from granite, gneiss, and schist. Slopes range from 0 to 8 percent.

Walpole soils are similar to Rippowam soils and in many areas are near Merrimac and Sudbury soils. Walpole soils contain more gravel than Rippowam soils. Unlike Rippowam soils, they are not subject to flooding. They are grayer, more poorly drained, and sandier than Merrimac and Sudbury soils.

Typical pedon of Walpole fine sandy loam, in a wooded area, 500 feet east of Old Westfield Road, 100 feet south of Winchell Road, in the town of Granville:

A—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; many fine roots; about 5 percent gravel; very strongly acid; clear smooth boundary.

Bw—4 to 11 inches; brown (10YR 4/3) fine sandy loam; few coarse prominent yellowish red (5YR 5/8) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; about 10 percent gravel; very strongly acid; clear smooth boundary.

Bg—11 to 18 inches; dark grayish brown (2.5Y 4/2) sandy loam; few coarse prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine roots; about 10 percent gravel; very strongly acid; abrupt smooth boundary.

Cg—18 to 65 inches; dark grayish brown (10YR 4/2) sand and gravel; single grain; loose; about 45 percent gravel; strongly acid.

The thickness of the solum ranges from 18 to 28 inches. The content of rock fragments ranges from 0 to 25 percent in the solum and from 0 to 50 percent in the substratum. In unlimed areas reaction is very strongly acid to slightly acid throughout the profile.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam, sandy loam, or the gravelly analogs of those textures.

The B and C horizons have hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. The B horizon is sandy loam or fine sandy loam. The C horizon is fine sand to coarse sand.

Westminster Series

The Westminster series consists of shallow, somewhat excessively drained soils on uplands. These soils formed in a thin mantle of glacial till and fractured rock derived mainly from gneiss, schist, and granite. Slopes range from 3 to 45 percent.

Westminster soils are similar to Millsite soils and in many areas are adjacent to Ashfield and Shelburne soils. Unlike Westminster soils, Millsite soils are moderately deep and Ashfield and Shelburne soils have a dense substratum and are very deep.

Typical pedon of Westminster loam, in an area of Millsite-Westminster complex, 3 to 8 percent slopes, very rocky, in Huntington State Forest, 250 feet south of the end of Sampson Road, 250 feet northeast of a trail, in the town of Westhampton:

Oi—3 to 2 inches; loose leaves and twigs.

Oe—2 inches to 0; humus.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; friable; many fine and common medium roots; about 5 percent rock fragments; very strongly acid; clear smooth boundary.

Bw1—3 to 9 inches; dark yellowish brown (10YR 4/4) loam; weak fine granular structure; friable; many fine and few medium roots; about 5 percent rock fragments; very strongly acid; clear wavy boundary.

Bw2—9 to 14 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; common fine roots; about 5 percent rock fragments; very strongly acid; clear wavy boundary.

Bw3—14 to 18 inches; dark brown (7.5YR 4/4) sandy loam; weak fine granular structure; friable; few fine roots; about 5 percent rock fragments; strongly acid; abrupt wavy boundary.

R—18 inches; schist bedrock.

The thickness of the solum ranges from 10 to 20 inches. It is the same as the depth to bedrock. In

unlimed areas reaction is very strongly acid or strongly acid throughout the solum.

The A horizon has hue of 7.5YR or 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is loam or fine sandy loam. It has 5 to 15 percent rock fragments.

The Bw horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It generally is fine sandy loam, loam, or the gravelly analogs of those textures. In some pedons, however, it is sandy loam in the lower part. This horizon has 5 to 30 percent rock fragments.

The R horizon is schist, gneiss, or granitic bedrock.

Whitman Series

The Whitman series consists of very deep, very poorly drained soils in depressions and drainageways on uplands. These soils formed in glacial till derived mainly from granite, gneiss, and schist. Slopes range from 0 to 8 percent.

Whitman soils are similar to Peacham soils and in many areas are adjacent to Montauk, Paxton, Scituate, and Woodbridge soils. Whitman soils have a warmer temperature regime than Peacham soils and have a subsoil that is grayer than that of Scituate and Woodbridge soils. Unlike Whitman soils, Montauk and Paxton soils are not mottled.

Typical pedon of Whitman mucky loam, in an area of Ridgebury-Whitman-Palms association, undulating, extremely stony, 1,750 feet south of the intersection of General Knox Road and South Quarter Road, 200 feet west of South Quarter Road, in the town of Russell:

Oi—2 inches to 1 inch; mat of maple leaves and dead grasses.

Oe—1 inch to 0; partially decomposed maple leaves and wetland grasses.

Oa—0 to 2 inches; very dark gray (10YR 3/1) muck; many fine roots; strongly acid; abrupt smooth boundary.

A—2 to 8 inches; very dark gray (10YR 2.5/1) mucky loam; weak fine granular structure; friable; many fine and common medium roots; about 5 percent rock fragments; strongly acid; clear smooth boundary.

Bwg—8 to 10 inches; very dark gray (10YR 2.5/1) silt loam; massive; friable, slightly sticky and slightly plastic; many fine and few medium roots; about 5 percent rock fragments; moderately acid; abrupt smooth boundary.

Cg—10 to 21 inches; dark gray (N 4/0) sandy loam; few fine prominent strong brown (7.5YR 5/8) mottles; massive; friable; about 5 percent rock fragments; strongly acid; clear smooth boundary.

Cd1—21 to 28 inches; dark gray (N 4/0) sandy loam that has lenses of coarse sand; many coarse prominent light brownish gray (2.5Y 6/2) and very dark gray (10YR 2.5/1) mottles; massive; firm; about 5 percent rock fragments; moderately acid; clear smooth boundary.

Cd2—28 to 35 inches; gray (2.5Y 5/1) sandy loam; many coarse prominent olive yellow (2.5Y 6/8) and strong brown (7.5YR 5/8) mottles; massive; firm; about 5 percent rock fragments; slightly acid; clear smooth boundary.

Cd3—35 to 65 inches; olive gray (5Y 5/2) sandy loam; many coarse prominent olive yellow (2.5Y 6/2) and strong brown (7.5YR 5/8) mottles; massive; firm; about 5 percent rock fragments; slightly acid.

Depth to the dense substratum ranges from 12 to 30 inches. The content of rock fragments ranges from 5 to 25 percent throughout the profile. Reaction is very strongly acid to slightly acid throughout the profile.

The A horizon is neutral in hue or has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is sandy loam to silt loam or is the mucky analogs of the textures within that range.

The B horizon is neutral in hue or has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is sandy loam, fine sandy loam, or loam. It is very friable or friable.

The Cd horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is firm or very firm and is brittle.

Windsor Series

The Windsor series consists of very deep, excessively drained soils on outwash plains, kames, and stream terraces. These soils formed in sandy glacial outwash derived mainly from crystalline rock. Slopes range from 0 to 45 percent.

Windsor soils are similar to Hinckley and Merrimac soils and in many areas are near Sudbury soils. Windsor soils have a lower content of gravel than Hinckley and Merrimac soils. Unlike Windsor soils, Sudbury soils are mottled.

Typical pedon of Windsor loamy fine sand, 1 to 5 percent slopes, in a wooded area, 500 feet north of the intersection of Winchell Road and Old Westfield Road, 50 feet east of the Old Westfield Road, in the town of Granville:

Ap—0 to 4 inches; dark brown (10YR 3/3) loamy fine sand; weak fine granular structure; very friable; common fine roots; about 5 percent rock fragments; very strongly acid; clear wavy boundary.

Bw1—4 to 14 inches; yellowish brown (10YR 5/8) loamy sand; weak coarse subangular blocky structure;

very friable; few fine roots; about 5 percent rock fragments; very strongly acid; gradual smooth boundary.

Bw2—14 to 22 inches; light olive brown (2.5YR 5/4) loamy sand; single grain; loose; few fine roots; about 5 percent rock fragments; very strongly acid; gradual smooth boundary.

BC—22 to 30 inches; pale olive (5Y 6/4) sand; single grain; loose; about 5 percent rock fragments; very strongly acid; gradual smooth boundary.

C—30 to 65 inches; pale olive (5YR 6/3) sand; single grain; loose; about 5 percent rock fragments; very strongly acid.

The thickness of the solum ranges from 18 to 30 inches. In unlimed areas reaction is extremely acid to moderately acid throughout the profile.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. It is loamy fine sand or loamy sand.

The upper part of the Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is loamy sand or loamy fine sand. The lower part has hue of 7.5YR to 5Y, value of 4 to 7, and chroma of 3 to 6. It is loamy fine sand, loamy sand, fine sand, or sand.

The C horizon has hue of 5YR to 5Y, value of 4 to 7, and chroma of 1 to 6. It is fine sand, sand, loamy fine sand, or loamy sand.

Wonsqueak Series

The Wonsqueak series consists of very deep, very poorly drained soils in depressions and drainageways. These soils formed in organic material about 16 to 51 inches thick. Slopes range from 0 to 2 percent.

Wonsqueak soils are similar to Lupton and Palms soils and in many areas are adjacent to Pillsbury and Peacham soils. Wonsqueak soils are shallower to a mineral horizon than Lupton soils, are colder than Palms soils, and have a thicker mantle of organic material than is characteristic of Peacham soils. Unlike Wonsqueak soils, Pillsbury soils are poorly drained.

Typical pedon of Wonsqueak muck, in an area of Pillsbury-Peacham-Wonsqueak association, undulating, extremely stony, about 6,500 feet northeast of the intersection of Chester Road and Huntington Road, 200 feet north of Huntington Road, in the town of Blandford:

Oa1—0 to 10 inches; sapric material, very dark brown (10YR 2/2) broken face and rubbed; about 5 percent fiber, 5 percent rubbed; massive; about 20 percent mineral material; many fine and very fine roots; very strongly acid; clear smooth boundary.

Oa2—10 to 18 inches; sapric material, dark brown (7.5YR 3/2) broken face and rubbed; about 20 percent fiber, 10 percent rubbed; massive; about 20 percent mineral material; many fine and very fine roots; very strongly acid; clear smooth boundary.

Oa3—18 to 27 inches; sapric material, dark reddish brown (5YR 2/2) broken face and rubbed; about 30 percent fiber, 15 percent rubbed; massive; about 15 percent mineral material; very strongly acid; gradual smooth boundary.

2C—27 to 65 inches; dark gray (5Y 4/1) very fine sandy loam; massive; very friable, slightly sticky; moderately acid.

The organic material ranges from more than 16 inches to less than 51 inches in thickness. Reaction is very strongly acid to slightly acid in 0.1M calcium chloride.

The organic material has hue of 2.5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. The surface tier is primarily sapric material but has some hemic or fibric material. The subsurface and bottom tiers are generally sapric material but have layers of hemic material that have a combined thickness of less than 10 inches or layers of fibric material that have a combined thickness of less than 5 inches.

The 2C horizon is neutral in hue or has hue of 5YR to 5GY. It has value of 3 to 6 and chroma of 0 to 4. It is silt loam, loam, very fine sandy loam, or fine sandy loam. It has 0 to 20 percent rock fragments.

Woodbridge Series

The Woodbridge series consists of very deep, moderately well drained soils on uplands. These soils formed in loamy glacial till derived mainly from granite, gneiss, and schist. Slopes range from 0 to 25 percent.

Woodbridge soils are similar to Scituate soils and in many areas are adjacent to Paxton and Ridgebury soils. Woodbridge soils are finer textured than Scituate soils and have lower base saturation than those soils. Unlike Woodbridge soils, Paxton soils are not mottled. Ridgebury soils have a subsoil that is grayer than that of Woodbridge soils.

Typical pedon of Woodbridge fine sandy loam, 3 to 8 percent slopes, in a wooded area, 200 feet south of Gorge Road, 75 feet east of North Lane 1, in the town of Granville:

Oe—2 inches to 0; partially decomposed hemlock, oak, and beech leaves.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium granular structure; friable; many fine and medium roots; about 10 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw1—5 to 13 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine and medium subangular

blocky structure; friable; few fine and common medium roots; about 10 percent rock fragments; strongly acid; clear smooth boundary.

Bw2—13 to 24 inches; brown (10YR 5/3) fine sandy loam; many medium distinct strong brown (7.5YR 5/8) and few fine faint gray (N 6/0) mottles; weak medium subangular blocky structure; friable; few fine roots; about 10 percent rock fragments; strongly acid; clear smooth boundary.

Cd—24 to 65 inches; gray (5Y 6/1) gravelly sandy loam; common coarse distinct strong brown (7.5YR 5/8) mottles; weak medium platy structure; firm; about 25 percent rock fragments; moderately acid.

Depth to the dense substratum ranges from 18 to 34 inches. The solum is fine sandy loam, loam, or the gravelly analogs of those textures. The content of rock fragments ranges from 5 to 25 percent in the solum and from 5 to 40 percent in the substratum. Reaction is very strongly acid to moderately acid throughout the profile.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The upper part of the B horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8. The lower part has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. It has low-chroma mottles within a depth of 24 inches.

The Cd horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 1 to 4. It is firm or very firm and is brittle.

Formation of the Soils

Soils form through the interaction of parent material, climate, topography, living organisms, and time *(4)*. The nature and properties of soils formed anywhere on the earth depend on a combination of these five factors. The relative importance of each factor differs from place to place. In extreme cases one factor dominates the formation of a soil and influences most of the physical and chemical properties of the soil.

Parent Material

The western part of Hampden and Hampshire Counties is within the glaciated region of North America. Most of the soils in the survey area formed in glacial deposits. Bedrock formations in the survey area and north and west of the area were the source of much of the glacial material. The soils generally formed in glacial till, old water-laid deposits, recent alluvial deposits, or organic deposits.

The soils that formed in glacial till include Ashfield, Berkshire, Charlton, Chatfield, Hollis, Lyman, Marlow, Paxton, Peru, Pillsbury, Ridgebury, Shelburne, Tunbridge, and Woodbridge soils. The ones that formed in water-laid deposits include Hinckley, Merrimac, Sudbury, and Windsor soils. The ones that formed in recent alluvial deposits include Pootatuck and Rippowam soils. The ones that formed in organic material are Lupton, Palms, and Wonsqueak soils.

Climate

Ashfield, Berkshire, Lyman, Marlow, Millsite, Peru, Pillsbury, Shelburne, Tunbridge, and other frigid soils at elevations of more than 1,000 feet in the survey area formed under a colder climate than the soils at elevations of less than 1,000 feet. The rate of plant growth is slower in the frigid areas at the higher elevations than in the mesic areas at the lower, warmer elevations. Also, the soil-forming processes proceed at a slower rate.

Topography

The shape of the land surface, the slope, and the landscape position of the soils have greatly influenced soil formation in the survey area. Most of the soils have slopes that favor the development of distinct soil horizons.

On the steeper slopes erosion is rapid and almost keeps pace with the weathering of rocks and the formation of soils. The soils on these slopes generally have a seasonal high water table at a depth of more than 6 feet and a subsoil that is bright and is not mottled. Nearly level soils in depressions or on bottom land, where surface runoff and internal drainage are slow and the water table is high, have a wet, mottled, poorly aerated subsoil. The profiles in these poorly drained soils are normally not so well developed as the profiles in the better drained soils.

Living Organisms

Micro-organisms, plants, insects, and animals influence the physical and chemical characteristics of soils. Plant roots promote soil aggregation and add organic matter to the soils when they decompose. The burrowing activities of small animals and insects mix and aerate the soils. Human activities, such as farming and industrial expansion, have altered the shape and nature of landforms in many areas. This working and shaping of the land can significantly alter the properties of the soils on or around these landforms.

Time

The process of soil formation is continual and takes place over a long period. With the passage of time, the influence of the other soil-forming factors becomes more pronounced. In this survey area most of the soils are the same relative age and are influenced by the same organisms. Consequently, the differences among the soils in the survey area are primarily the result of variations in parent material, climate, and topography.

References

(1) American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.

(2) American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Dresser, Harriet L., and Thomas Packard. 1964. The Hampshire history. Hampshire County Comm.

(4) Jenny, Hans. 1941. Factors of soil formation.

(5) Latimer, W.J., and L.R. Smith. 1932. Soil survey of Hampden and Hampshire Counties, Massachusetts. U.S. Dep. Agric., Bur. of Chem. and Soils.

(6) Pabst, Margaret. 1984. Agricultural trends in the Connecticut Valley region of Massachusetts. Smith College, Stud. in Hist.

(7) Society of American Foresters. 1954. Forest cover types of North America. Rep. Comm. Forest Types.

(8) Soil Science Society of America and American Society of Agronomy. 1966. Soil surveys and land use planning.

(9) United States Department of Agriculture. 1972. Soil survey laboratory methods and procedures for collecting soil samples. Soil Surv. Invest. Rep. 1.

(10) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436.

(11) United States Department of Agriculture. 1993. Soil survey manual. U.S. Dep. Agric. Handb. 18.

(12) United States Department of Health, Education, and Welfare. 1957. Manual of septic tank practices. Public Health Serv. Publ. 526.

Glossary

ABC Soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 65-inch profile or to a limiting layer is expressed as:

Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
H gn	more than 5.2

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Congeliturbate. Soil material disturbed by frost action.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that

part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial..

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits (geology). Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked

pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 1-5 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon,

hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range in moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special

practices are required to ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0 10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediments of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil

material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1963-86 at Cummington Hill, Massachusetts)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	27.5	11.2	19.4	54	-13	0	3.17	1.31	4.74	6	18.7
February----	30.2	13.2	21.7	53	-10	0	3.23	1.62	4.62	7	17.5
March-------	39.3	21.9	30.6	66	-2	14	3.39	2.03	4.60	7	13.8
April-------	52.0	32.8	42.4	81	13	138	3.87	1.96	5.52	7	4.7
May---------	64.5	43.7	54.1	87	26	437	4.70	2.45	6.65	8	.7
June--------	72.1	52.6	62.4	88	37	672	4.10	2.30	5.68	8	.0
July--------	77.0	57.5	67.3	90	44	846	4.34	2.41	6.04	7	.0
August------	75.2	55.8	65.5	88	40	791	3.98	2.09	5.62	7	.0
September---	67.6	48.1	57.9	86	31	537	3.70	2.15	5.08	6	.0
October-----	57.8	38.1	48.0	78	20	268	3.43	2.17	4.56	6	.1
November----	44.8	29.3	37.1	68	8	63	4.43	2.81	5.89	9	5.7
December----	32.3	17.0	24.7	57	-9	6	3.97	2.39	5.38	8	18.1
Yearly:											
Average---	53.4	35.1	44.3	---	---	---	---	---	---	---	---
Extreme---	---	---	---	90	-16	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,772	46.31	38.38	53.83	86	79.3

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1963-86 at Cummington Hill, Massachusetts)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 28	May 9	May 23
2 years in 10 later than--	Apr. 24	May 5	May 18
5 years in 10 later than--	Apr. 15	Apr. 26	May 9
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 11	Oct. 1	Sept. 20
2 years in 10 earlier than--	Oct. 17	Oct. 6	Sept. 25
5 years in 10 earlier than--	Oct. 29	Oct. 16	Oct. 5

TABLE 3.--GROWING SEASON

(Recorded in the period 1963-86 at Cummington Hill, Massachusetts)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	176	153	126
8 years in 10	182	159	134
5 years in 10	195	172	149
2 years in 10	209	185	163
1 year in 10	218	193	171

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Pootatuck fine sandy loam	246	0.1
4	Rippowam very fine sandy loam	392	0.2
31	Walpole fine sandy loam	1,136	0.4
57	Lupton muck	2,191	0.9
120B	Millsite-Westminster complex, 3 to 8 percent slopes, very rocky	652	0.3
121C	Millsite-Westminster-Rock outcrop complex, 8 to 15 percent slopes	481	0.2
122B	Tunbridge-Lyman complex, 3 to 8 percent slopes	717	0.3
122C	Tunbridge-Lyman complex, 8 to 15 percent slopes	675	0.3
253B	Hinckley very gravelly sandy loam, 3 to 8 percent slopes	748	0.3
253C	Hinckley very gravelly sandy loam, 8 to 15 percent slopes	735	0.3
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	1,656	0.6
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	2,518	1.0
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	1,520	0.6
255B	Windsor loamy fine sand, 1 to 5 percent slopes	556	0.2
257E	Hinckley and Windsor soils, steep	1,923	0.7
260A	Sudbury fine sandy loam, 0 to 3 percent slopes	849	0.3
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	621	0.2
300B	Montauk fine sandy loam, 3 to 8 percent slopes	291	0.1
305C	Paxton fine sandy loam, 8 to 15 percent slopes	369	0.1
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	108	*
315B	Scituate fine sandy loam, 3 to 8 percent slopes	252	0.1
355B	Marlow loam, 3 to 8 percent slopes	874	0.3
355C	Marlow loam, 8 to 15 percent slopes	653	0.3
360A	Peru loam, 0 to 3 percent slopes	264	0.1
360B	Peru loam, 3 to 8 percent slopes	1,447	0.6
360C	Peru loam, 8 to 15 percent slopes	394	0.2
370B	Shelburne loam, 3 to 8 percent slopes	687	0.3
370C	Shelburne loam, 8 to 15 percent slopes	605	0.2
375B	Ashfield fine sandy loam, 3 to 8 percent slopes	1,338	0.5
375C	Ashfield fine sandy loam, 8 to 15 percent slopes	413	0.2
600	Pits, gravel	375	0.1
903C	Chatfield-Hollis association, rolling, extremely stony	7,744	3.0
904C	Lyman-Tunbridge association, rolling, extremely stony	32,723	12.7
905C	Peru-Marlow association, rolling, extremely stony	27,155	10.6
909E	Tunbridge-Lyman association, steep, extremely stony	33,213	12.9
910C	Woodbridge-Paxton association, rolling, extremely stony	4,510	1.8
911C	Ashfield-Shelburne association, rolling, extremely stony	17,078	6.7
912E	Hollis-Chatfield association, steep, extremely stony	25,801	10.0
914E	Marlow-Berkshire association, steep, extremely stony	9,728	3.8
915E	Montauk-Canton association, steep, extremely stony	439	0.2
916E	Paxton-Charlton association, steep, extremely stony	4,562	1.8
919C	Scituate-Montauk association, rolling, extremely stony	1,571	0.6
920E	Shelburne-Ashfield association, steep, extremely stony	4,210	1.6
921C	Westminster-Millsite association, rolling, extremely stony	18,816	7.3
921E	Westminster-Millsite association, steep, extremely stony	15,835	6.2
922B	Pillsbury-Peacham-Wonsqueak association, undulating, extremely stony	21,050	8.2
923B	Ridgebury-Whitman-Palms association, undulating, extremely stony	2,089	0.8
	Water	4,525	1.8
	Total	256,735	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
2	Pootatuck fine sandy loam
254A	Merrimac fine sandy loam, 0 to 3 percent slopes
254B	Merrimac fine sandy loam, 3 to 8 percent slopes
260A	Sudbury fine sandy loam, 0 to 3 percent slopes
260B	Sudbury fine sandy loam, 3 to 8 percent slopes
300B	Montauk fine sandy loam, 3 to 8 percent slopes
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes
315B	Scituate fine sandy loam, 3 to 8 percent slopes
355B	Marlow loam, 3 to 8 percent slopes
360A	Peru loam, 0 to 3 percent slopes
360B	Peru loam, 3 to 8 percent slopes
370B	Shelburne loam, 3 to 8 percent slopes
375B	Ashfield fine sandy loam, 3 to 8 percent slopes

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn silage	Alfalfa hay	Grass-clover	Sweet corn
		Tons	Tons	AUM*	Tons
2------------------------- Pootatuck	IIw	24	4.0	7.5	6.3
4------------------------- Rippowam	IVw	---	---	3.5	---
31------------------------ Walpole	IVw	---	---	4.7	---
57------------------------ Lupton	VIw	---	---	---	---
120B**-------------------- Millsite-Westminster	VIs	---	---	---	---
121C**-------------------- Millsite-Westminster- Rock outcrop	VIIs	---	---	---	---
122B**-------------------- Tunbridge-Lyman	IIIe	17	---	5.2	---
122C**-------------------- Tunbridge-Lyman	IVe	15	---	5.2	---
253B---------------------- Hinckley	IIIs	10	2	3.6	---
253C---------------------- Hinckley	IVs	---	---	2.5	---
254A, 254B---------------- Merrimac	IIs	18	4	5.7	6.1
254C---------------------- Merrimac	IIIe	16	4	5.7	6.0
255B---------------------- Windsor	IIIs	14	3.0	5.5	---
257E**-------------------- Hinckley and Windsor	VIIs	---	---	---	---
260A---------------------- Sudbury	IIw	18	3.5	7.6	5.9
260B---------------------- Sudbury	IIe	18	3.5	7.6	5.9
300B---------------------- Montauk	IIe	22	4.0	6.5	---
305C---------------------- Paxton	IIIe	22	4.5	7.5	---
310B---------------------- Woodbridge	IIe	24	4.0	7.5	5.6

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Alfalfa hay	Grass-clover	Sweet corn
		Tons	Tons	AUM*	Tons
315B: Scituate	IIw	24	4.0	6.5	---
355B: Marlow	IIe	22	4.5	7.8	---
355C: Marlow	IIIe	20	4.5	7.8	---
360A: Peru	IIw	20	4.0	---	---
360B: Peru	IIe	20	4.0	---	---
360C: Peru	IIIe	18	4.0	---	---
370B: Shelburne	IIe	24	4.5	7.5	---
370C: Shelburne	IIIe	22	4.5	7.5	---
375B: Ashfield	IIw	22	4.0	5.6	---
375C: Ashfield	IIIe	20	3.5	4.8	---
600**. Pits					
903C**: Chatfield-Hollis	VIIs	---	---	---	
904C**: Lyman-Tunbridge	VIIs	---	---	---	---
905C**: Peru-Marlow	VIIs	---	---	---	---
909E**: Tunbridge-Lyman	VIIs	---	---	---	---
910C**: Woodbridge-Paxton	VIIs	---	---	---	---
911C**: Ashfield-Shelburne	VIIs	---	---	---	---
912E**: Hollis-Chatfield	VIIs	---	---	---	---
914E**: Marlow-Berkshire	VIIs	---	---	---	---
915E**: Montauk-Canton	VIIs	---	---	---	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Alfalfa hay	Grass-clover	Sweet corn
		Tons	Tons	AUM*	Tons
916E**: Paxton-Charlton	VIIs	---	---	---	---
919C**: Scituate-Montauk	VIIs	---	---	---	---
920E**: Shelburne-Ashfield	VIIs	---	---	---	---
921C**: Westminster-Millsite	VIIs	---	---	---	---
921E**: Westminster-Millsite	VIIs	---	---	---	---
922B**:					
Pillsbury	VIIs	---	---	---	---
Peacham	VIIs	---	---	---	---
Wonsqueak	Vw	---	---	---	---
923B**:					
Ridgebury	VIIs	---	---	---	---
Whitman	VIIs	---	---	---	---
Palms	Vw	---	---	---	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
2--------------- Pootatuck	10A	Slight	Slight	Slight	Moderate	Eastern white pine--	75	10	Eastern white pine, white spruce.
						Red pine------------	75	10	
						Red maple-----------	60	3	
						Yellow birch--------	60	3	
4--------------- Rippowam	3W	Slight	Severe	Severe	Severe	Red maple-----------	75	3	Eastern white pine, white spruce.
						Eastern white pine--	65	8	
31-------------- Walpole	3W	Slight	Severe	Severe	Severe	Red maple-----------	75	3	Eastern white pine, white spruce, northern whitecedar, Norway spruce.
						White ash-----------	61	3	
						Eastern hemlock-----	54	8	
						Eastern white pine--	68	8	
57-------------- Lupton	2W	Slight	Severe	Severe	Severe	Black spruce--------	20	2	---
						Balsam fir----------	46	6	
						Black ash-----------	---	---	
						Northern whitecedar-	---	---	
						Paper birch---------	---	---	
						Tamarack------------	---	---	
						Red maple-----------	---	---	
						Quaking aspen-------	---	---	
						White spruce--------	---	---	
120B**:									
Millsite-------	3A	Slight	Slight	Slight	Moderate	Sugar maple---------	73	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	60	3	
						White ash-----------	75	3	
Westminster----	2D	Slight	Slight	Moderate	Moderate	Sugar maple---------	---	---	White spruce, balsam fir, eastern white pine.
						White spruce--------	55	9	
						Balsam fir----------	48	8	
						Red spruce----------	42	6	
						Eastern white pine--	56	7	
						Northern red oak----	54	3	
						Paper birch---------	---	---	
						Eastern hemlock-----	---	---	
						American beech------	---	---	
121C**:									
Millsite-------	3A	Slight	Slight	Slight	Moderate	Sugar maple---------	73	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	60	3	
						White ash-----------	75	3	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
121C**:									
Westminster----	2D	Slight	Slight	Moderate	Moderate	Sugar maple---------	---	---	White spruce, balsam fir, eastern white pine.
						White spruce--------	55	9	
						Balsam fir----------	48	8	
						Red spruce----------	42	6	
						Eastern white pine--	56	7	
						Northern red oak----	54	3	
						Paper birch---------	---	---	
						Eastern hemlock-----	---	---	
						American beech------	---	---	
Rock outcrop.									
122B**, 122C**:									
Tunbridge------	3A	Slight	Slight	Slight	Slight	Sugar maple---------	60	3	Eastern white pine, red spruce, white spruce, balsam fir, Norway spruce.
						Northern red oak----	68	4	
						Eastern white pine--	65	8	
						Red spruce----------	45	7	
						Yellow birch--------	60	3	
						Paper birch---------	78	3	
						White spruce--------	55	9	
						Balsam fir----------	---	---	
						White ash-----------	65	3	
Lyman----------	2D	Slight	Slight	Moderate	Moderate	Sugar maple---------	---	---	White spruce, balsam fir, eastern white pine.
						White spruce--------	55	9	
						Balsam fir----------	48	8	
						Red spruce----------	42	6	
						Eastern white pine--	56	7	
						Northern red oak----	54	3	
						Paper birch---------	---	---	
						Eastern hemlock-----	---	---	
						American beech------	---	---	
253B, 253C------ Hinckley	7S	Slight	Slight	Severe	Slight	Eastern white pine--	60	7	Eastern white pine.
						Northern red oak----	49	2	
						Red pine------------	58	7	
						Sugar maple---------	57	2	
254A, 254B, 254C----------- Merrimac	2S	Slight	Slight	Moderate	Moderate	Northern red oak----	51	2	Eastern white pine, red pine.
						Eastern white pine--	64	8	
						Sugar maple---------	58	3	
255B----------- Windsor	7S	Slight	Slight	Severe	Slight	Eastern white pine--	57	7	Eastern white pine, red pine, Norway spruce.
						Northern red oak----	52	2	
						Red pine------------	61	7	
						Sugar maple---------	55	2	
257E**:									
Hinckley-------	7S	Moderate	Moderate	Severe	Slight	Eastern white pine--	60	7	Eastern white pine.
						Northern red oak----	49	2	
						Red pine------------	58	7	
						Sugar maple---------	57	2	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
257E**:									
Windsor	7S	Moderate	Moderate	Severe	Slight	Eastern white pine	57	7	Eastern white pine, red pine, Norway spruce.
						Northern red oak	52	2	
						Red pine	61	7	
						Sugar maple	55	2	
260A, 260B Sudbury	7A	Slight	Slight	Slight	Moderate	Eastern white pine	60	7	Eastern white pine, red pine, European larch, white spruce, Norway spruce.
						Northern red oak	45	2	
						Red spruce	47	7	
						Red pine	60	6	
300B Montauk	3A	Slight	Slight	Slight	Moderate	Sugar maple	65	3	Norway spruce, white spruce, European larch.
						Northern red oak	70	4	
						Red pine	75	8	
						Eastern white pine	75	10	
305C Paxton	3D	Slight	Slight	Moderate	Moderate	Northern red oak	65	3	Red pine, eastern white pine, Norway spruce, European larch.
						Red pine	67	8	
						Eastern white pine	66	8	
						Sugar maple	75	3	
310B Woodbridge	4D	Slight	Slight	Slight	Moderate	Northern red oak	72	4	Eastern white pine, red pine, European larch.
						Eastern white pine	67	8	
						Red pine	65	8	
						Red spruce	50	8	
						Sugar maple	65	3	
315B Scituate	3A	Slight	Slight	Slight	Moderate	Northern red oak	61	3	Eastern white pine.
						Eastern white pine	65	8	
						Sugar maple	55	2	
						Red pine	70	9	
355B, 355C Marlow	8A	Slight	Slight	Slight	Moderate	Eastern white pine	66	8	Eastern white pine, white spruce, red pine.
						Balsam fir	58	8	
						Red spruce	48	7	
						Sugar maple	60	3	
						Red pine	65	8	
						Yellow birch	60	3	
						Paper birch	65	5	
						White spruce	60	10	
						White ash	67	3	
						American beech	60	3	
						Northern red oak	67	3	
						American basswood	56	2	
360A, 360B, 360C Peru	8A	Slight	Slight	Slight	Moderate	Eastern white pine	67	8	Eastern white pine.
						Sugar maple	60	3	
						Northern red oak	67	3	
						Red spruce	39	6	
						Balsam fir	55	8	
						White spruce	53	8	
						White ash	64	3	
						Red pine	61	7	
						Yellow birch	60	3	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Plant competi-tion	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc-tivity class*	Trees to plant
370B, 370C------ Shelburne	3A	Slight	Slight	Slight	Moderate	Northern red oak----	60	3	Eastern white pine, red pine, European larch.
						Sugar maple---------	70	3	
						Eastern white pine--	60	7	
						Red pine------------	70	9	
375B, 375C------ Ashfield	2A	Slight	Slight	Slight	Moderate	Sugar maple---------	57	2	Eastern white pine.
						Eastern white pine--	71	9	
						White spruce--------	64	10	
						Balsam fir----------	62	8	
						Northern whitecedar-	60	6	
						American beech------	66	3	
						Paper birch---------	59	4	
						White ash-----------	61	3	
						Eastern hemlock-----	60	---	
903C**:									
Chatfield------	3X	Slight	Moderate	Slight	Moderate	Sugar maple---------	65	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	70	4	
						White ash-----------	75	3	
Hollis---------	2X	Slight	Moderate	Moderate	Slight	Northern red oak----	47	2	Eastern white pine.
						Eastern white pine--	55	6	
						Sugar maple---------	56	2	
904C**:									
Lyman----------	2X	Slight	Slight	Moderate	Moderate	Sugar maple---------	50	2	White spruce, balsam fir, eastern white pine, red pine.
						White spruce--------	55	9	
						Balsam fir----------	60	8	
						Red spruce----------	40	6	
Tunbridge------	3X	Slight	Moderate	Slight	Slight	Sugar maple---------	60	3	Eastern white pine, red spruce, white spruce, balsam fir, Scotch pine, tamarack.
						Northern red oak----	---	---	
						Eastern white pine--	50	6	
						Red spruce----------	50	8	
						Yellow birch--------	55	2	
						Paper birch---------	---	---	
						White spruce--------	55	9	
						Balsam fir----------	---	---	
						White ash-----------	65	3	
905C**:									
Peru-----------	8X	Slight	Slight	Slight	Moderate	Eastern white pine--	67	8	Eastern white pine.
						Sugar maple---------	60	3	
						Northern red oak----	70	4	
						Red spruce----------	39	6	
						Balsam fir----------	55	8	
						White spruce--------	53	8	
						White ash-----------	64	3	
						Red pine------------	61	7	
						Yellow birch--------	60	3	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
905C**:									
Marlow	8X	Slight	Slight	Slight	Moderate	Eastern white pine	66	8	Eastern white pine, white spruce, red pine.
						Balsam fir	58	8	
						Red spruce	48	7	
						Sugar maple	60	3	
						Red pine	65	8	
						Yellow birch	60	3	
						Paper birch	65	5	
						White spruce	60	10	
						White ash	67	3	
						American beech	60	3	
						Northern red oak	67	3	
						American basswood	56	2	
909E**:									
Tunbridge	3R	Moderate	Moderate	Slight	Slight	Sugar maple	60	3	Eastern white pine, red spruce, white spruce.
						Northern red oak	---	---	
						Eastern white pine	50	6	
						Red spruce	50	8	
						Yellow birch	55	2	
						Paper birch	---	---	
						White spruce	55	9	
						Balsam fir	---	---	
						White ash	65	3	
Lyman	2X	Moderate	Moderate	Moderate	Moderate	Sugar maple	50	2	White spruce, balsam fir, eastern white pine, red pine.
						White spruce	55	9	
						Balsam fir	60	8	
						Red spruce	40	6	
910C**:									
Woodbridge	4X	Moderate	Moderate	Slight	Moderate	Northern red oak	72	4	Eastern white pine, European larch, red pine.
						Red pine	65	8	
						Eastern white pine	67	8	
						Red spruce	50	8	
						Sugar maple	65	3	
Paxton	3X	Slight	Moderate	Slight	Moderate	Northern red oak	65	3	Red pine, Norway spruce, eastern white pine, European larch.
						Eastern white pine	66	8	
						Red pine	67	8	
						Sugar maple	75	3	
911C**:									
Ashfield	2A	Slight	Slight	Slight	Moderate	Sugar maple	57	2	Eastern white pine.
						Eastern white pine	71	9	
						White spruce	64	10	
						Balsam fir	62	8	
						Northern whitecedar	60	6	
						American beech	66	3	
						Paper birch	59	4	
						White ash	61	3	
						Eastern hemlock	60	---	
Shelburne	3A	Slight	Slight	Slight	Moderate	Northern red oak	60	3	Eastern white pine, red pine, European larch.
						Sugar maple	70	3	
						Eastern white pine	60	7	
						Red pine	70	9	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
912E**:									
Hollis	2X	Moderate	Moderate	Moderate	Slight	Northern red oak	47	2	Eastern white pine.
						Eastern white pine	55	6	
						Sugar maple	56	2	
Chatfield	3X	Slight	Moderate	Slight	Moderate	Sugar maple	65	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak	70	4	
						White ash	75	3	
914E**:									
Marlow	8X	Moderate	Moderate	Slight	Moderate	Eastern white pine	66	8	Eastern white pine, white spruce, red pine.
						Balsam fir	58	8	
						Red spruce	48	7	
						Sugar maple	60	3	
						Red pine	65	8	
						Yellow birch	60	3	
						Paper birch	65	5	
						White spruce	60	10	
						White ash	67	3	
						American beech	60	3	
						Northern red oak	67	3	
						American basswood	56	2	
Berkshire	9X	Slight	Moderate	Slight	Moderate	Eastern white pine	72	9	Eastern white pine, balsam fir, white spruce, red pine.
						Sugar maple	52	2	
						Red spruce	50	8	
						White ash	62	3	
						Yellow birch	55	2	
						Paper birch	60	4	
						Balsam fir	60	8	
						White spruce	55	9	
						Red pine	65	8	
915E**:									
Montauk	3X	Slight	Moderate	Slight	Moderate	Sugar maple	65	3	Eastern white pine.
						Northern red oak	70	4	
						Eastern white pine	75	10	
Canton	7X	Slight	Moderate	Slight	Slight	Eastern white pine	58	7	Eastern white pine, white spruce.
						Northern red oak	52	2	
916E**:									
Paxton	3X	Moderate	Moderate	Slight	Slight	Northern red oak	65	3	Eastern white pine, red pine, white spruce, eastern hemlock, European larch.
						Eastern white pine	65	8	
						Red pine	70	9	
						Red spruce	50	8	
						Red maple	55	2	
						Shagbark hickory	---	---	
						Sugar maple	55	2	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
916E**:									
Charlton-------	3R	Moderate	Moderate	Slight	Moderate	Northern red oak----	65	3	Red pine, Norway spruce, eastern white pine, European larch.
						Eastern white pine--	66	8	
						Red pine------------	67	8	
						Sugar maple---------	75	3	
919C**:									
Scituate-------	3X	Slight	Slight	Slight	Moderate	Northern red oak----	61	3	Eastern white pine, white spruce.
						Eastern white pine--	65	8	
						Sugar maple---------	55	2	
						Red pine------------	70	9	
Montauk--------	3X	Slight	Moderate	Slight	Moderate	Sugar maple---------	65	3	Eastern white pine.
						Northern red oak----	70	4	
						Eastern white pine--	75	10	
920E**:									
Shelburne------	3R	Moderate	Moderate	Slight	Moderate	Northern red oak----	60	3	Eastern white pine, red pine, European larch.
						Sugar maple---------	70	3	
						Eastern white pine--	60	7	
						Red pine------------	70	9	
Ashfield-------	2R	Moderate	Moderate	Slight	Moderate	Sugar maple---------	57	2	Eastern white pine.
						Eastern white pine--	71	9	
						White spruce--------	64	10	
						Balsam fir----------	62	8	
						Northern whitecedar-	60	6	
						American beech------	66	3	
						Paper birch---------	59	4	
						White ash-----------	61	3	
						Eastern hemlock-----	60	---	
921C**:									
Westminster----	2D	Slight	Slight	Moderate	Moderate	Sugar maple---------	---	---	White spruce, balsam fir, eastern white pine.
						White spruce--------	55	9	
						Balsam fir----------	48	8	
						Red spruce----------	42	6	
						Eastern white pine--	56	7	
						Northern red oak----	54	3	
						Paper birch---------	---	---	
						Eastern hemlock-----	---	---	
						American beech------	---	---	
Millsite-------	3A	Slight	Slight	Slight	Moderate	Sugar maple---------	73	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	60	3	
						White ash-----------	75	3	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Plant competi-tion	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc-tivity class*	Trees to plant
921E**:									
Westminster----	2D	Moderate	Moderate	Moderate	Moderate	Sugar maple---------	---	---	White spruce, balsam fir, eastern white pine.
						White spruce--------	55	9	
						Balsam fir----------	48	8	
						Red spruce----------	42	6	
						Eastern white pine--	56	7	
						Northern red oak----	54	3	
						Paper birch---------	---	---	
						Eastern hemlock-----	---	---	
						American beech------	---	---	
Millsite-------	3R	Slight	Moderate	Slight	Moderate	Sugar maple---------	73	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	60	3	
						White ash-----------	75	3	
922B**:									
Pillsbury------	7X	Slight	Severe	Moderate	Severe	Eastern white pine--	60	7	Eastern white pine, white spruce.
						Northern red oak----	60	3	
						Red spruce----------	47	7	
						Sugar maple---------	55	2	
						Balsam fir----------	51	7	
Peacham--------	3X	Slight	Severe	Severe	Severe	Red maple-----------	60	3	---
						Eastern white pine--	---	---	
						European alder------	---	---	
						Red spruce----------	---	---	
						Northern whitecedar-	---	---	
						Black spruce--------	---	---	
						Tamarack------------	---	---	
Wonsqueak------	2W	Slight	Severe	Severe	Severe	Black spruce--------	20	2	---
						Tamarack------------	---	---	
						Northern whitecedar-	---	---	
						Balsam fir----------	---	---	
						Balsam poplar-------	---	---	
						Quaking aspen-------	---	---	
						Red maple-----------	---	---	
923B**:									
Ridgebury------	3W	Slight	Severe	Severe	Severe	Northern red oak----	57	3	Eastern white pine, white spruce.
						Red spruce----------	47	7	
						Eastern white pine--	63	8	
						Sugar maple---------	52	2	
Whitman--------	2W	Slight	Severe	Severe	Severe	Red maple-----------	55	2	---
						Eastern white pine--	56	7	
						Red spruce----------	44	6	
Palms.									

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2 Pootatuck	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
4 Rippowam	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
31 Walpole	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
57 Lupton	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
120B*:					
Millsite	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
Westminster	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight	Severe: depth to rock.
121C*:					
Millsite	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
Westminster	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: depth to rock.
Rock outcrop.					
122B*:					
Tunbridge	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
Lyman	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight	Severe: depth to rock.
122C*:					
Tunbridge	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
Lyman	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: depth to rock.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
253B: Hinckley	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones, droughty.
253C: Hinckley	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones, droughty.
254A: Merrimac	Slight	Slight	Moderate: small stones.	Slight	Slight.
254B: Merrimac	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
254C: Merrimac	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
255B: Windsor	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
257E*:					
Hinckley	Moderate: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Windsor	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
260A: Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, small stones.	Slight	Slight.
260B: Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, small stones.	Slight	Slight.
300B: Montauk	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Slight	Severe: droughty.
305C: Paxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
310B: Woodbridge	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Moderate: wetness.	Moderate: wetness.
315B: Scituate	Moderate: small stones, wetness.	Moderate: wetness, small stones.	Severe: small stones.	Moderate: wetness.	Moderate: small stones, wetness.
355B: Marlow	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight	Slight.
355C: Marlow	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
360A------------------ Peru	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
360B------------------ Peru	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
360C------------------ Peru	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
370B------------------ Shelburne	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight----------	Moderate.
370C------------------ Shelburne	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
375B------------------ Ashfield	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: large stones.
375C------------------ Ashfield	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: large stones, slope.
600*. Pits					
903C*:					
Chatfield------------	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Slight----------	Moderate: small stones, large stones, slope.
Hollis---------------	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Slight----------	Severe: depth to rock.
904C*:					
Lyman----------------	Severe: depth to rock, large stones.	Severe: large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Slight----------	Severe: depth to rock.
Tunbridge------------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones.
905C*:					
Peru-----------------	Moderate: large stones, wetness.	Moderate: wetness, large stones.	Severe: large stones, slope.	Moderate: wetness.	Moderate: large stones, wetness.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
905C*:					
Marlow	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight	Moderate: large stones, slope.
909E*:					
Tunbridge	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones.
Lyman	Severe: slope, depth to rock, large stones.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
910C*:					
Woodbridge	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Moderate: wetness.	Moderate: large stones, wetness, slope.
Paxton	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Slight	Moderate: large stones, slope.
911C*:					
Ashfield	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: large stones, slope.
Shelburne	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
912E*:					
Hollis	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Chatfield	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
914E*:					
Marlow	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
Berkshire	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope.
915E*:					
Montauk	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
915E*:					
Canton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
916E*:					
Paxton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
Charlton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
919C*:					
Scituate	Severe: large stones.	Severe: large stones.	Severe: slope, large stones, small stones.	Moderate: large stones, wetness.	Severe: large stones.
Montauk	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Slight	Moderate: small stones, large stones, slope.
920E*:					
Shelburne	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Ashfield	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Moderate: wetness, slope.	Severe: slope.
921C*:					
Westminster	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: depth to rock.
Millsite	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
921E*:					
Westminster	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
Millsite	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
922B*:					
Pillsbury	Severe: large stones, wetness.	Severe: wetness, large stones.	Severe: large stones.	Severe: wetness.	Severe: wetness.
Peacham	Severe: large stones, ponding, percs slowly.	Severe: ponding, large stones, excess humus.	Severe: large stones, excess humus, ponding.	Severe: large stones, ponding, excess humus.	Severe: large stones, ponding, excess humus.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
922B*:					
Wonsqueak	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
923B*:					
Ridgebury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, large stones, small stones.	Severe: wetness.	Severe: wetness.
Whitman	Severe: ponding.	Severe: ponding.	Severe: ponding, large stones.	Severe: ponding.	Severe: ponding.
Palms	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2 Pootatuck	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
4 Rippowam	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
31 Walpole	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
57 Lupton	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
120B*:										
Millsite	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Westminster	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
121C*:										
Millsite	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Westminster	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop.										
122B*:										
Tunbridge	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Lyman	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
122C*:										
Tunbridge	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Lyman	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
253B, 253C Hinckley	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
254A, 254B, 254C Merrimac	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
255B Windsor	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
257E*:										
Hinckley	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
257E*:										
Windsor	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
260A Sudbury	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
260B Sudbury	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
300B Montauk	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
305C Paxton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
310B Woodbridge	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
315B Scituate	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
355B Marlow	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
355C Marlow	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
360A Peru	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
360B Peru	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
360C Peru	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
370B Shelburne	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
370C Shelburne	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
375B, 375C Ashfield	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
600*. Pits										
903C*:										
Chatfield	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.
Hollis	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
904C*:										
Lyman	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
904C*:										
Tunbridge	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
905C*:										
Peru	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
Marlow	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
909E*:										
Tunbridge	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Lyman	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
910C*:										
Woodbridge	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Paxton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
911C*:										
Ashfield	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Shelburne	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
912E*:										
Hollis	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Chatfield	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Very poor.	Fair	Very poor.
914E*:										
Marlow	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Berkshire	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
915E*:										
Montauk	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Canton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
916E*:										
Paxton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Charlton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
919C*:										
Scituate	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Montauk	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
920E*:										
Shelburne	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ashfield	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
921C*:										
Westminster	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Millsite	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
921E*:										
Westminster	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Millsite	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
922B*:										
Pillsbury	Very poor.	Very poor.	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Peacham	Very poor.	Poor	Poor	Poor	Poor	Poor	Very poor.	Poor	Poor	Very poor.
Wonsqueak	Very poor.	Poor	Poor	Very poor.	Very poor.	Good	Good	Poor	Very poor.	Good.
923B*:										
Ridgebury	Very poor.	Poor	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Whitman	Very poor.	Poor	Poor	Poor	Poor	Poor	Very poor.	Poor	Poor	Very poor.
Palms	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2----------------- Pootatuck	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
4----------------- Rippowam	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
31---------------- Walpole	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
57---------------- Lupton	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
120B*:						
Millsite---------	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Moderate: droughty.
Westminster------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
121C*:						
Millsite---------	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: droughty, slope.
Westminster------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.
Rock outcrop.						
122B*:						
Tunbridge--------	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Moderate: droughty.
Lyman------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
122C*:						
Tunbridge--------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Moderate: droughty, slope.
Lyman------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
253B-------------- Hinckley	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: small stones, droughty.
253C-------------- Hinckley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
254A-------------- Merrimac	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
254B-------------- Merrimac	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
254C-------------- Merrimac	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
255B-------------- Windsor	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
257E*:						
Hinckley---------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Windsor----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
260A-------------- Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Slight.
260B-------------- Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: wetness, frost action.	Slight.
300B-------------- Montauk	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Severe: droughty.
305C-------------- Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: slope.
310B-------------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
315B-------------- Scituate	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: small stones, wetness.
355B-------------- Marlow	Moderate: dense layer.	Slight---------	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Slight.
355C-------------- Marlow	Moderate: dense layer, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: frost action.	Moderate: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
360A-------------- Peru	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: wetness.
360B-------------- Peru	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
360C-------------- Peru	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.
370B-------------- Shelburne	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: slope.
370C-------------- Shelburne	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, frost action, slope.	Moderate: slope.
375B-------------- Ashfield	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: large stones.
375C-------------- Ashfield	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: frost action.	Moderate: large stones, slope.
600*. Pits						
903C*:						
Chatfield--------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope, large stones.	Moderate: slope, depth to rock, frost action.	Moderate: small stones, large stones, slope.
Hollis-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
904C*:						
Lyman------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.
Tunbridge--------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: large stones.
905C*:						
Peru-------------	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: large stones, wetness.
Marlow-----------	Moderate: dense layer, wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
909E*:						
Tunbridge--------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones.
Lyman------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
910C*:						
Woodbridge-------	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: large stones, wetness, slope.
Paxton-----------	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, slope.
911C*:						
Ashfield---------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: frost action.	Moderate: large stones, slope.
Shelburne--------	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, frost action, slope.	Moderate: slope.
912E*:						
Hollis-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Chatfield--------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
914E*:						
Marlow-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Berkshire--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
915E*:						
Montauk----------	Severe: cutbanks cave, wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Canton-----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
916E*:						
Paxton-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
916E*:						
Charlton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
919C*:						
Scituate----------	Severe: wetness.	Moderate: wetness, slope, large stones.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Severe: large stones.
Montauk-----------	Severe: cutbanks cave, wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: small stones, large stones, slope.
920E*:						
Shelburne---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ashfield----------	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: slope, frost action.	Severe: slope.
921C*:						
Westminster-------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.
Millsite----------	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: droughty, slope.
921E*:						
Westminster-------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Millsite----------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
922B*:						
Pillsbury---------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Peacham-----------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: large stones, ponding, excess humus.
Wonsqueak---------	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding, frost action.	Severe: ponding, excess humus.
923B*:						
Ridgebury---------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
923B*:						
Whitman----------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, ponding.	Severe: ponding.
Palms------------	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "severe," "poor," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2------------------- Pootatuck	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
4------------------- Rippowam	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
31------------------ Walpole	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
57------------------ Lupton	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
120B*:					
Millsite-----------	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
Westminster--------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
121C*:					
Millsite-----------	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
Westminster--------	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
Rock outcrop.					
122B*:					
Tunbridge----------	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
Lyman--------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
122C*:					
Tunbridge----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
122C*:					
Lyman	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
253B Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
253C Hinckley	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
254A, 254B Merrimac	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
254C Merrimac	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
255B Windsor	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
257E*:					
Hinckley	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, too sandy, slope.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
Windsor	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
260A, 260B Sudbury	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, small stones.
300B Montauk	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too sandy.	Moderate: wetness.	Poor: seepage, small stones.
305C Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
310B Woodbridge	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
315B Scituate	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Poor: small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
355B: Marlow	Severe: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones, wetness.
355C: Marlow	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
360A: Peru	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
360B: Peru	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
360C: Peru	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
370B: Shelburne	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
370C: Shelburne	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: small stones.
375B: Ashfield	Severe: wetness, percs slowly.	Severe: seepage.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
375C: Ashfield	Severe: wetness, percs slowly.	Severe: seepage, slope.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
600*. Pits					
903C*:					
Chatfield	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
Hollis	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock, thin layer.
904C*:					
Lyman	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock, seepage.	Poor: depth to rock.
Tunbridge	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
905C*:					
Peru	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
Marlow	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
909E*:					
Tunbridge	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
Lyman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
910C*:					
Woodbridge	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
911C*:					
Ashfield	Severe: wetness, percs slowly.	Severe: seepage, slope.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
Shelburne	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: small stones.
912E*:					
Hollis	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope, thin layer.
Chatfield	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
914E*:					
Marlow	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Berkshire	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
915E*:					
Montauk	Severe: wetness, percs slowly, slope.	Severe: seepage, slope, wetness.	Severe: slope.	Severe: seepage, slope.	Poor: seepage, slope.
Canton	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope.
916E*:					
Paxton	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Charlton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
919C*:					
Scituate	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
Montauk	Severe: wetness, percs slowly.	Severe: seepage, slope, wetness.	Moderate: wetness, slope, too sandy.	Severe: seepage.	Poor: seepage.
920E*:					
Shelburne	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Ashfield	Severe: wetness, percs slowly, slope.	Severe: seepage, slope.	Severe: wetness, slope.	Severe: seepage, wetness, slope.	Poor: slope, wetness.
921C*:					
Westminster	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
Millsite	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
921E*:					
Westminster	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Millsite	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Poor: slope, area reclaim.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
922B*:					
Pillsbury----------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Peacham------------	Severe: ponding, percs slowly.	Severe: excess humus, ponding, large stones.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Wonsqueak----------	Severe: ponding, percs slowly.	Severe: seepage, excess humus.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
923B*:					
Ridgebury----------	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Whitman------------	Severe: percs slowly, ponding.	Moderate: slope.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Palms--------------	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2: Pootatuck	Fair: wetness.	Probable	Improbable: too sandy.	Fair: thin layer.
4: Rippowam	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
31: Walpole	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
57: Lupton	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
120B*:				
Millsite	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Westminster	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, area reclaim, small stones.
121C*:				
Millsite	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Westminster	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, area reclaim, small stones.
Rock outcrop.				
122B*, 122C*:				
Tunbridge	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Lyman	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, area reclaim, small stones.
253B, 253C: Hinckley	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
254A, 254B, 254C: Merrimac	Good	Probable	Probable	Poor: small stones, area reclaim.
255B: Windsor	Good	Probable	Improbable: too sandy.	Poor: too sandy.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
257E*:				
Hinckley	Poor: slope.	Probable	Probable	Poor: too sandy, small stones, slope.
Windsor	Poor: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
260A, 260B Sudbury	Fair: wetness.	Probable	Probable	Poor: small stones, too sandy, area reclaim.
300B Montauk	Fair: wetness.	Probable	Probable	Poor: area reclaim, small stones.
305C Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
310B Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
315B Scituate	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
355B, 355C Marlow	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
360A, 360B, 360C Peru	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
370B, 370C Shelburne	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
375B, 375C Ashfield	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
600*. Pits				
903C*:				
Chatfield	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Hollis	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock.
904C*:				
Lyman	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
904C*:				
Tunbridge	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
905C*:				
Peru	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Marlow	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
909E*:				
Tunbridge	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Lyman	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
910C*:				
Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
911C*:				
Ashfield	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Shelburne	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
912E*:				
Hollis	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
Chatfield	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
914E*:				
Marlow	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Berkshire	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
915E*:				
Montauk	Poor: slope.	Probable	Probable	Poor: small stones, slope.
Canton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
916E*:				
Paxton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Charlton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
919C*:				
Scituate	Fair: large stones, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Montauk	Fair: wetness.	Probable	Probable	Poor: small stones.
920E*:				
Shelburne	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
Ashfield	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
921C*:				
Westminster	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, area reclaim, small stones.
Millsite	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
921E*:				
Westminster	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, depth to rock, small stones.
Millsite	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
922B*:				
Pillsbury	Poor: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, small stones, wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
922B*:				
Peacham	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess humus, small stones.
Wonsqueak	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
923B*:				
Ridgebury	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
Whitman	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, large stones, area reclaim.
Palms	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
2: Pootatuck	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, too sandy.	Favorable.
4: Rippowam	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness, too sandy, poor outlets.	Wetness.
31: Walpole	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, too sandy.	Wetness.
57: Lupton	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Wetness.
120B*:						
Millsite	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Slope, depth to rock, droughty.	Depth to rock	Depth to rock, droughty.
Westminster	Severe: depth to rock.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
121C*:						
Millsite	Severe: slope, seepage.	Severe: seepage, piping.	Severe: no water.	Slope, depth to rock, droughty.	Slope, depth to rock.	Slope, depth to rock, droughty.
Westminster	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
122B*:						
Tunbridge	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Depth to rock, soil blowing.	Droughty, depth to rock.
Lyman	Severe: depth to rock.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
122C*:						
Tunbridge	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
Lyman	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
253B Hinckley	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, too sandy.	Large stones, droughty.
253C Hinckley	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
254A, 254B Merrimac	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy	Favorable.
254C Merrimac	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope.
255B Windsor	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty.
257E*:						
Hinckley	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
Windsor	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
260A Sudbury	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave	Too sandy, wetness.	Favorable.
260B Sudbury	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave.	Too sandy, wetness.	Favorable.
300B Montauk	Moderate: slope.	Severe: seepage, piping.	Severe: no water.	Percs slowly, slope, cutbanks cave.	Wetness, too sandy.	Droughty, rooting depth.
305C Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, rooting depth, percs slowly.
310B Woodbridge	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly.	Rooting depth, percs slowly.
315B Scituate	Moderate: slope.	Moderate: piping.	Severe: no water.	Percs slowly, slope.	Large stones, wetness, percs slowly.	Droughty, rooting depth.
355B Marlow	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly	Rooting depth, percs slowly.
355C Marlow	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, rooting depth, percs slowly.
360A Peru	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Rooting depth, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
360B-------------- Peru	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly.	Rooting depth, percs slowly.
360C-------------- Peru	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Slope, rooting depth, percs slowly.
370B-------------- Shelburne	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly---	Rooting depth.
370C-------------- Shelburne	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, rooting depth.
375B-------------- Ashfield	Severe: seepage.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Large stones, erodes easily.	Large stones, wetness.
375C-------------- Ashfield	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones, erodes easily.	Large stones, wetness, slope.
600*. Pits						
903C*:						
Chatfield--------	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Hollis-----------	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
904C*:						
Lyman------------	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Large stones, slope, depth to rock.
Tunbridge--------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
905C*:						
Peru-------------	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly.	Rooting depth, percs slowly.
Marlow-----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, rooting depth, percs slowly.
909E*:						
Tunbridge--------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Lyman------------	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Large stones, slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
910C*:						
Woodbridge	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Slope, rooting depth, percs slowly.
Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, rooting depth, percs slowly.
911C*:						
Ashfield	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones, erodes easily.	Large stones, wetness, slope.
Shelburne	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, rooting depth.
912E*:						
Hollis	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Chatfield	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
914E*:						
Marlow	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, rooting depth, percs slowly.
Berkshire	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
915E*:						
Montauk	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Percs slowly, slope, cutbanks cave.	Slope, wetness, too sandy.	Slope, droughty, rooting depth.
Canton	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope.
916E*:						
Paxton	Severe: slope, seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Slope	Slope.
Charlton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, rooting depth, percs slowly.
919C*:						
Scituate	Severe: slope.	Severe: seepage.	Severe: no water.	Percs slowly, slope.	Slope, large stones, wetness.	Large stones, slope, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
919C*:						
Montauk	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Percs slowly, slope, cutbanks cave.	Slope, wetness, too sandy.	Slope, droughty, rooting depth.
920E*:						
Shelburne	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, rooting depth.
Ashfield	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones, erodes easily.	Large stones, wetness, slope.
921C*, 921E*:						
Westminster	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Millsite	Severe: slope, seepage.	Severe: seepage, piping.	Severe: no water.	Slope, depth to rock, droughty.	Slope, depth to rock.	Slope, depth to rock, droughty.
922B*:						
Pillsbury	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, large stones, slope.	Large stones, wetness, percs slowly.	Large stones, wetness, rooting depth.
Peacham	Moderate: slope.	Severe: piping, ponding.	Severe: slow refill.	Ponding, percs slowly, frost action.	Large stones, ponding, rooting depth.	Large stones, wetness, droughty.
Wonsqueak	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Erodes easily, ponding.	Wetness, erodes easily.
923B*:						
Ridgebury	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Slope, percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly, rooting depth.
Whitman	Moderate: slope.	Severe: piping, ponding.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, large stones.	Wetness, percs slowly, rooting depth.
Palms	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Erodes easily, ponding, soil blowing.	Wetness, erodes easily, rooting depth.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
2---------------- Pootatuck	0-9	Fine sandy loam	SM, ML	A-2, A-4	0	95-100	80-100	55-95	30-75	<25	NP-4
	9-20	Fine sandy loam, sandy loam.	SM	A-2, A-4	0	95-100	80-100	55-85	30-50	<20	NP-2
	20-65	Stratified loamy fine sand to very gravelly coarse sand.	SP, SP-SM, SM	A-1, A-2, A-3	0-15	70-100	45-100	25-75	0-25	---	NP
4---------------- Rippowam	0-10	Very fine sandy loam.	SM, ML	A-2, A-4	0	95-100	80-100	55-95	30-75	<25	NP-4
	10-28	Fine sandy loam, sandy loam.	SM	A-2, A-4	0	95-100	80-100	55-85	30-50	<20	NP-2
	28-65	Stratified loamy fine sand to very gravelly coarse sand.	SP, SP-SM, SM	A-1, A-2, A-3	0-10	70-100	45-100	25-75	0-25	---	NP
31--------------- Walpole	0-11	Fine sandy loam	SM, ML	A-2, A-4	0-5	90-100	75-100	55-90	25-60	<25	NP-3
	11-18	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4	0-5	85-100	60-100	40-85	20-50	---	NP
	18-65	Stratified loamy fine sand to very gravelly coarse sand.	SP, SM, GP, GM	A-1, A-2, A-3	0-20	55-100	50-100	25-80	2-30	---	NP
57--------------- Lupton	0-20	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	20-65	Muck-------------	PT	A-8	0	---	---	---	---	---	---
120B*:											
Millsite---------	0-6	Loam-------------	SM, ML, CL-ML	A-4, A-2	0-5	80-95	75-90	50-80	25-65	10-20	1-6
	6-35	Fine sandy loam, gravelly loam, gravelly sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-5	60-95	55-90	35-80	15-65	10-20	1-6
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Westminster------	0-9	Loam-------------	ML, SM	A-4, A-1, A-2	0-15	80-95	70-90	40-85	20-80	<35	NP-6
	9-18	Loam, channery fine sandy loam, silt loam, sandy loam.	SM, ML, GM	A-2, A-4, A-1	0-20	65-95	60-90	35-85	20-80	<30	NP-4
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
121C*:											
Millsite---------	0-6	Loam-------------	SM, ML, CL-ML	A-4, A-2	0-5	80-95	75-90	50-80	25-65	10-20	1-6
	6-35	Fine sandy loam, gravelly loam, gravelly sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-5	60-95	55-90	35-80	15-65	10-20	1-6
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
121C*:											
Westminster	0-9	Loam	ML, SM	A-4, A-1, A-2	0-15	80-95	70-90	40-85	20-80	<35	NP-6
	9-18	Loam, channery fine sandy loam, silt loam.	SM, ML, GM	A-2, A-4, A-1	0-20	65-95	60-90	35-85	20-80	<30	NP-4
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
122B*:											
Tunbridge	0-3	Loam	SM, ML	A-4, A-2	0-5	85-100	80-95	55-95	30-85	<20	NP-2
	3-14	Silt loam, loam, gravelly fine sandy loam, channery fine sandy loam.	SM, ML	A-2, A-5	0-15	70-100	65-95	45-95	25-85	<50	NP-6
	14-24	Silt loam, loam, gravelly fine sandy loam, channery fine sandy loam.	SM, ML	A-2, A-4	0-15	70-100	65-95	45-95	25-85	<20	NP-2
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lyman	0-3	Loam	ML, SM	A-4, A-1, A-2	0-15	80-95	70-90	40-85	20-80	<35	NP-6
	3-19	Loam, channery fine sandy loam, silt loam.	SM, ML, GM	A-2, A-4, A-1	0-20	65-95	60-90	35-85	20-80	<30	NP-4
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
122C*:											
Tunbridge	0-3	Loam	SM, ML	A-4, A-2	0-5	85-100	80-95	55-95	30-85	<20	NP-2
	3-14	Silt loam, gravelly fine sandy loam, channery fine sandy loam.	SM, ML	A-2, A-5	0-15	70-100	65-95	45-95	25-85	<50	NP-6
	14-24	Silt loam, gravelly fine sandy loam, channery fine sandy loam.	SM, ML	A-2, A-4	0-15	70-100	65-95	45-95	25-85	<20	NP-2
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lyman	0-3	Loam	ML, SM	A-4, A-1, A-2	0-15	80-95	70-90	40-85	20-80	<35	NP-6
	3-19	Loam, channery fine sandy loam, silt loam.	SM, ML, GM	A-2, A-4, A-1	0-20	65-95	60-90	35-85	20-80	<30	NP-4
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
253B, 253C-------Hinckley	0-8	Very gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2	0-15	40-60	35-50	20-45	10-30	<20	NP
	8-17	Gravelly loamy sand, loamy fine sand, very gravelly loamy coarse sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	<20	NP
	17-65	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	0-25	50-65	30-50	10-40	0-20	<10	NP
254A, 254B, 254C-Merrimac	0-9	Fine sandy loam	SM, ML	A-2, A-4	0	85-95	70-90	40-85	20-55	<20	NP
	9-26	Gravelly sandy loam, sandy loam.	SM	A-2	0	75-95	70-90	40-60	20-35	<25	NP
	26-33	Gravelly loamy sand, sandy loam, gravelly sandy loam.	SP, SM, SP-SM	A-1, A-2, A-3	0	65-95	55-90	30-60	0-35	<25	NP
	33-65	Stratified sand to very gravelly coarse sand.	GP, SP, SP-SM, GP-GM	A-1	5-25	40-65	30-60	15-40	0-10	---	NP
255B-------------Windsor	0-4	Loamy fine sand	SM	A-1, A-2	0	95-100	80-100	45-90	20-35	---	NP
	4-22	Loamy sand, loamy fine sand.	SM	A-1, A-2	0	95-100	80-100	45-90	15-30	---	NP
	22-65	Sand, fine sand, loamy sand.	SM, SP, SP-SM	A-1, A-2, A-3	0	90-100	75-100	40-90	2-30	---	NP
257E*:											
Hinckley---------	0-8	Very gravelly sandy loam.	GM	A-1, A-2	0-5	45-55	40-50	25-35	10-20	<20	NP
	8-17	Gravelly loamy sand, loamy fine sand, very gravelly loamy coarse sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	<20	NP
	17-65	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	5-25	50-65	30-50	10-40	0-20	<10	NP
Windsor----------	0-4	Loamy fine sand	SM	A-1, A-2	0	95-100	80-100	45-90	20-35	---	NP
	4-22	Loamy sand, loamy fine sand.	SM	A-1, A-2	0	95-100	80-100	45-90	15-30	---	NP
	22-65	Sand, fine sand, loamy sand.	SM, SP, SP-SM	A-1, A-2, A-3	0	90-100	75-100	40-90	2-30	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
260A, 260B------- Sudbury	0-7	Fine sandy loam	SM, ML	A-2, A-4, A-1	0-5	85-100	70-100	40-90	20-55	---	NP
	7-15	Sandy loam, gravelly fine sandy loam, gravelly sandy loam.	SM	A-2, A-4, A-1	0-5	85-100	60-100	40-80	20-50	---	NP
	15-25	Very gravelly coarse sand, loamy sand, sandy loam.	SM, SP-SM	A-1, A-2, A-3	0-5	70-100	60-100	30-70	5-35	---	NP
	25-65	Stratified sand and gravel.	SP, SP-SM, GP, GP-GM	A-1	10-40	35-70	25-65	15-45	0-10	26-65	NP
300B------------- Montauk	0-7	Fine sandy loam	SM, SC-SM	A-2, A-4	0-5	80-100	75-100	45-95	20-85	<20	NP-4
	7-24	Fine sandy loam, gravelly sandy loam, silt loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1	0-15	60-100	55-95	35-90	15-80	<20	NP-4
	24-65	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-2, A-1, A-4	0-15	60-100	55-95	20-80	10-50	<15	NP-2
305C------------- Paxton	0-5	Fine sandy loam	SM, ML, GM	A-2, A-4	0-10	85-95	75-90	50-80	20-65	<40	NP-10
	5-18	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-65	<30	NP-7
	18-65	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7
310B------------- Woodbridge	0-5	Fine sandy loam	SM, ML	A-2, A-4	0-10	85-95	75-90	50-80	25-65	<40	NP-10
	5-24	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-65	<30	NP-7
	24-65	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7
315B------------- Scituate	0-10	Fine sandy loam	SM, ML	A-2, A-4, A-1	0-5	80-95	70-90	40-85	20-65	<20	NP-4
	10-23	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4, A-1	0-25	70-95	60-90	35-85	20-65	<20	NP-4
	23-65	Loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM	A-1, A-2	0-25	65-85	50-75	30-65	12-30	<15	NP-2
355B, 355C------- Marlow	0-14	Loam------------	SM, ML, CL-ML, SC	A-2, A-4	0-10	90-100	75-90	50-90	30-80	<30	NP-10
	14-24	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	75-95	60-90	40-85	20-65	<30	NP-10
	24-65	Gravelly fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	70-90	60-85	35-80	20-60	<30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
360A, 360B, 360C-- Peru	0-11	Loam	SM, ML, CL-ML	A-2, A-4	0-10	90-100	75-90	50-90	30-80	<30	NP-10
	11-17	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	75-95	60-90	40-85	20-65	<30	NP-10
	17-65	Gravelly fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	70-95	55-95	35-80	20-60	<30	NP-10
370B, 370C-- Shelburne	0-6	Loam	SM, ML	A-2-4, A-4	0-5	90-100	75-95	45-90	25-70	<40	NP-8
	6-19	Loam, fine sandy loam, gravelly sandy loam.	SM, ML	A-2-4, A-4	0-30	65-95	50-90	30-85	15-65	<40	NP-8
	19-65	Loam, fine sandy loam, gravelly sandy loam.	SM, ML	A-1-b, A-2-4, A-4	0-30	65-95	50-90	30-85	15-65	<25	NP-8
375B, 375C-- Ashfield	0-3	Fine sandy loam	ML, SM	A-4, A-5	0-10	85-100	75-95	55-95	35-85	<47	NP-8
	3-15	Loam, silt loam, fine sandy loam.	ML, SM	A-4, A-5	5-20	85-100	75-95	55-90	35-70	<37	NP-6
	15-65	Gravelly loam, silt loam, gravelly fine sandy loam, sandy loam.	ML, SM, CL-ML, SC-SM	A-4	5-20	85-100	75-95	55-90	35-70	<27	NP-6
600*. Pits											
903C*: Chatfield	0-4	Extremely stony fine sandy loam.	SM, GM, GM-GC, SC-SM	A-4, A-2, A-1	3-25	55-80	50-75	30-65	15-50	10-20	1-6
	4-27	Silt loam, gravelly loam, gravelly sandy loam, fine sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-10	60-95	55-90	33-85	15-75	10-20	1-6
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hollis	0-2	Extremely stony loam.	SM, ML, GM	A-2, A-4	15-30	65-100	60-95	40-85	20-65	<25	NP-5
	2-16	Gravelly fine sandy loam, sandy loam, loam.	SM, ML, GM	A-2, A-4	0-15	65-100	60-95	40-80	20-65	<25	NP-5
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
904C*: Lyman	0-3	Extremely stony loam.	SM, ML, GM	A-1, A-2, A-4	10-30	65-95	55-90	30-75	15-70	<30	NP-6
	3-19	Loam, channery fine sandy loam, silt loam.	SM, ML, GM	A-1, A-2, A-4	0-20	65-95	60-90	35-85	20-80	<30	NP-4
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
904C*:											
Tunbridge-------	0-3	Extremely stony loam.	SM, ML, GM	A-4, A-2	10-35	65-100	60-95	40-95	25-85	<20	NP-2
	3-14	Silt loam, loam, gravelly fine sandy loam, channery fine sandy loam.	SM, ML	A-5, A-2	0-15	70-100	65-95	45-95	25-85	<50	NP-6
	14-24	Silt loam, gravelly fine sandy loam, channery fine sandy loam.	SM, ML	A-2, A-4	0-15	70-100	65-95	45-95	25-85	<20	NP-2
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
905C*:											
Peru------------	0-11	Extremely stony loam.	SM, ML, CL-ML, SC	A-2, A-4	10-30	90-100	75-90	45-85	25-60	<30	NP-10
	11-17	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	75-95	60-90	40-85	20-65	<30	NP-10
	17-65	Gravelly fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	70-95	55-95	35-80	20-60	<30	NP-10
Marlow----------	0-14	Extremely stony loam.	SM, ML, CL-ML, SC	A-2, A-4	10-30	90-100	75-90	45-85	25-65	<30	NP-10
	14-24	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	75-95	60-90	40-85	20-65	<30	NP-10
	24-65	Gravelly fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	70-90	60-85	35-80	20-60	<30	NP-10
909E*:											
Tunbridge-------	0-3	Extremely stony loam.	SM, ML, GM	A-4, A-2	10-35	65-100	60-95	40-95	25-85	<20	NP-2
	3-14	Silt loam, gravelly fine sandy loam, channery fine sandy loam.	SM, ML	A-5, A-2	0-15	70-100	65-95	45-95	25-85	<50	NP-6
	14-24	Silt loam, gravelly fine sandy loam, channery fine sandy loam.	SM, ML	A-2, A-4	0-15	70-100	65-95	45-95	25-85	<20	NP-2
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lyman-----------	0-3	Extremely stony loam.	SM, ML, GM	A-1, A-2, A-4	10-30	65-95	55-90	30-75	15-70	<30	NP-6
	3-19	Loam, channery fine sandy loam, silt loam.	SM, ML, GM	A-1, A-2, A-4	0-20	65-95	60-90	35-85	20-80	<30	NP-4
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
910C*:											
Woodbridge------	0-5	Extremely stony fine sandy loam.	SM, ML, GM	A-2, A-4	10-25	65-95	60-90	40-80	25-65	<40	NP-10
	5-24	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-60	<30	NP-7
	24-60	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7
Paxton----------	0-5	Extremely stony fine sandy loam.	SM, ML, GM	A-2, A-4	10-25	65-95	60-80	40-80	25-65	<40	NP-10
	5-18	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-65	<30	NP-7
	18-65	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7
911C*:											
Ashfield--------	0-3	Extremely stony fine sandy loam.	ML, SM	A-4, A-5	3-25	85-100	75-95	55-95	35-85	<47	NP-8
	3-15	Loam, silt loam, fine sandy loam.	ML, SM	A-4, A-5	5-20	85-100	75-95	55-90	35-70	<37	NP-6
	15-65	Gravelly loam, silt loam, gravelly fine sandy loam.	ML, SM, CL-ML, SC-SM	A-4	5-20	85-100	75-95	55-90	35-70	<27	NP-6
Shelburne-------	0-6	Extremely stony fine sandy loam.	SM, ML	A-2-4, A-4	3-20	90-100	75-95	45-90	25-70	<40	NP-8
	6-19	Loam, fine sandy loam, gravelly sandy loam.	SM, ML	A-2-4, A-4	0-30	65-95	50-90	30-85	15-65	<40	NP-8
	19-65	Loam, fine sandy loam, gravelly sandy loam.	SM, ML	A-1-b, A-2-4, A-4	0-30	65-95	50-90	30-85	15-65	<25	NP-8
912E*:											
Hollis----------	0-2	Extremely stony loam.	SM, ML, GM	A-2, A-4	15-30	65-100	60-95	40-85	20-65	<25	NP-5
	2-16	Gravelly fine sandy loam, sandy loam, loam.	SM, ML, GM	A-2, A-4	0-15	65-100	60-95	40-80	20-65	<25	NP-5
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Chatfield-------	0-4	Extremely stony fine sandy loam.	SM, GM, GM-GC, SC-SM	A-4, A-2, A-1	3-25	55-80	50-75	30-65	15-50	10-20	1-6
	4-27	Silt loam, gravelly loam, gravelly sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-10	60-95	55-90	33-85	15-75	10-20	1-6
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
914E*:											
Marlow	0-14	Extremely stony loam.	SM, ML, CL-ML, SC	A-2, A-4	10-30	90-100	75-90	45-85	25-65	<30	NP-10
	14-24	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	75-95	60-90	40-85	20-65	<30	NP-10
	24-65	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1-b	0-15	70-90	60-85	35-80	20-60	<30	NP-10
Berkshire	0-6	Extremely stony loam.	SM, ML	A-2, A-4, A-5	20-45	80-95	70-90	45-85	25-65	<50	NP-10
	6-18	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4, A-5	0-20	75-95	65-85	40-75	20-60	<50	NP-10
	18-65	Fine sandy loam, sandy loam, gravelly loam, gravelly sandy loam.	SM, ML	A-2, A-4	0-20	75-90	65-85	40-80	20-55	<20	NP-6
915E*:											
Montauk	0-7	Extremely stony loam.	SM, ML, GM, CL-ML	A-2, A-4, A-1	5-30	65-80	55-75	30-75	15-70	<20	NP-4
	7-24	Fine sandy loam, silt loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-1, A-2, A-4	0-5	60-100	55-95	35-90	15-80	<20	NP-4
	24-65	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-4	0-5	60-100	55-95	20-80	10-50	<15	NP-2
Canton	0-3	Extremely stony fine sandy loam.	SM, ML	A-2, A-4	20-45	70-95	60-90	40-85	25-60	<18	NP-8
	3-30	Fine sandy loam, very fine sandy loam, gravelly loam, gravelly fine sandy loam.	SM, ML	A-2, A-4	0-20	80-95	70-90	50-85	30-60	<18	NP-8
	30-65	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	0-20	65-85	50-80	20-60	10-30	---	NP
916E*:											
Paxton	0-5	Extremely stony fine sandy loam.	SM, ML	A-2, A-4	15-25	75-95	70-90	60-85	30-70	<25	NP-5
	5-18	Fine sandy loam, gravelly fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	50-80	20-65	<25	NP-3
	18-65	Fine sandy loam, gravelly fine sandy loam, gravelly sandy loam.	SM, GM	A-2, A-4	5-25	60-90	55-85	40-75	20-45	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
916E*:											
Charlton--------	0-8	Extremely stony fine sandy loam.	SM, ML, GM	A-2, A-4	10-25	65-95	60-80	40-80	25-65	<40	NP-10
	8-32	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-65	<30	NP-7
	32-65	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7
919C*:											
Scituate--------	0-10	Extremely stony fine sandy loam.	SM, ML, GM	A-2, A-4, A-1	15-35	60-90	55-85	35-80	20-65	<20	NP-4
	10-23	Fine sandy loam, loam, sandy loam.	SM, ML	A-2, A-4, A-1	0-25	70-95	60-90	35-85	20-65	<20	NP-4
	23-65	Loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM	A-1, A-2	0-25	65-85	50-75	30-65	12-30	<15	NP-2
Montauk---------	0-7	Extremely stony loam.	SM, ML, GM, CL-ML	A-2, A-4, A-1	5-30	65-80	55-75	30-75	15-70	<20	NP-4
	7-24	Fine sandy loam, silt loam, gravelly sandy loam.	SM, ML, SC-SM, CL-ML	A-1, A-2, A-4	0-5	60-100	55-95	35-90	15-80	<20	NP-4
	24-65	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-4	0-5	60-100	55-95	20-80	10-50	<15	NP-2
920E*:											
Shelburne-------	0-6	Extremely stony loam.	SM, ML	A-2-4, A-4	3-20	90-100	75-95	45-90	25-70	<40	NP-8
	6-19	Loam, fine sandy loam, gravelly sandy loam.	SM, ML	A-2-4, A-4	0-30	65-95	50-90	30-85	15-65	<40	NP-8
	19-65	Loam, fine sandy loam, gravelly sandy loam.	SM, ML	A-1-b, A-2-4, A-4	0-30	65-95	50-90	30-85	15-65	<25	NP-8
Ashfield--------	0-3	Extremely stony fine sandy loam.	ML, SM	A-4, A-5	3-25	85-100	75-95	55-95	35-85	<47	NP-8
	3-15	Loam, silt loam, fine sandy loam.	ML, SM	A-4, A-5	5-20	85-100	75-95	55-90	35-70	<37	NP-6
	15-65	Gravelly loam, silt loam, gravelly fine sandy loam.	ML, SM, CL-ML, SC-SM	A-4	5-20	85-100	75-95	55-90	35-70	<27	NP-6
921C*, 921E*:											
Westminster-----	0-9	Extremely stony loam.	ML, SM	A-4, A-1, A-2	5-30	80-95	70-90	40-85	20-80	<35	NP-6
	9-18	Loam, channery fine sandy loam, silt loam.	SM, ML, GM	A-2, A-4, A-1	0-20	65-95	60-90	35-85	20-80	<30	NP-4
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
921C*, 921E*:											
Millsite	0-6	Extremely stony loam.	SM, ML, CL-ML	A-4, A-2	5-20	80-95	75-90	50-80	25-65	10-20	1-6
	6-35	Fine sandy loam, gravelly loam, gravelly sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-5	60-95	55-90	35-80	15-65	10-20	1-6
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
922B*:											
Pillsbury	0-5	Extremely stony loam.	SM, ML	A-2, A-4	10-30	80-100	55-95	35-95	25-85	<25	NP-3
	5-19	Loam, fine sandy loam, gravelly fine sandy loam.	SM, ML	A-2, A-4	0-15	80-95	55-95	35-80	25-60	<25	NP-3
	19-65	Fine sandy loam, sandy loam, gravelly fine sandy loam.	SM, ML	A-2, A-4	0-15	80-95	55-95	35-80	25-60	<25	NP-3
Peacham	0-9	Extremely stony muck.	PT	A-8	10-30	---	---	---	---	---	---
	9-15	Silt loam, loam, gravelly fine sandy loam.	SM, ML	A-2, A-4, A-6	0-15	75-100	65-100	50-100	30-90	<30	NP-15
	15-65	Silt loam, loam, gravelly fine sandy loam.	SM, ML	A-2, A-4, A-6	0-15	75-100	65-100	50-100	30-90	<30	NP-15
Wonsqueak	0-10	Muck	PT	A-8	0	---	---	---	---	---	---
	10-27	Muck	PT	A-8	0	---	---	---	---	---	---
	27-65	Silt loam, fine sandy loam, silty clay loam, very fine sandy loam.	ML, SM, CL-ML, CL	A-4, A-2, A-6	0-5	85-100	75-100	50-100	30-95	<40	NP-20
923B*:											
Ridgebury	0-7	Extremely stony fine sandy loam.	SM, ML	A-2, A-4	5-30	70-100	60-90	45-85	25-65	---	NP
	7-20	Sandy loam, gravelly fine sandy loam, gravelly loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	20-65	Sandy loam, gravelly sandy loam, gravelly loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
923B*:											
Whitman----------	0-8	Extremely stony mucky loam.	ML, SM, CL-ML	A-1, A-2, A-4	5-25	65-80	60-75	35-70	20-65	16-35	NP-10
	8-10	Sandy loam, gravelly fine sandy loam, gravelly silt loam, silt loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-35	NP-10
	10-35	Sandy loam, gravelly fine sandy loam, loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-32	NP-8
	35-65	Loamy sand, gravelly loamy sand, gravelly sandy loam.	SM	A-1, A-2	0-10	65-95	60-90	30-65	15-35	---	NP
Palms-----------	0-11	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	11-47	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	47-65	Clay loam, silty clay loam, sandy loam, gravelly sandy loam.	CL-ML, CL, SC, SC-SM	A-4, A-6, A-7, A-2	0	85-100	60-100	35-95	15-90	20-45	5-20

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
2----------------- Pootatuck	0-9	2-6	1.10-1.35	0.6-6.0	0.11-0.21	4.5-7.3	Low-----------	0.20	5	3	2-6
	9-20	1-6	1.20-1.45	0.6-6.0	0.09-0.18	4.5-6.5	Low-----------	0.20			
	20-65	0-2	1.25-1.50	>6.0	0.01-0.10	4.5-6.5	Low-----------	0.17			
4----------------- Rippowam	0-10	2-6	1.10-1.35	0.6-6.0	0.11-0.21	4.5-7.3	Low-----------	0.20	5	3	3-8
	10-28	1-6	1.20-1.45	0.6-6.0	0.09-0.18	4.5-7.3	Low-----------	0.20			
	28-65	0-2	1.25-1.50	>6.0	0.01-0.10	4.5-7.3	Low-----------	0.17			
31---------------- Walpole	0-11	2-6	1.00-1.25	2.0-6.0	0.10-0.18	4.5-7.3	Low-----------	0.20	3	3	2-8
	11-18	2-6	1.30-1.55	2.0-6.0	0.07-0.15	4.5-7.3	Low-----------	0.24			
	18-65	0-2	1.40-1.65	>6.0	0.01-0.10	4.5-7.3	Low-----------	0.10			
57---------------- Lupton	0-20	---	0.10-0.35	0.2-6.0	0.35-0.45	5.6-7.8	--------------	----	5	2	70-90
	20-65	---	0.10-0.35	0.2-6.0	0.35-0.45	5.6-7.8	--------------	----			
120B*:											
Millsite---------	0-6	7-12	1.00-1.25	0.6-6.0	0.12-0.16	4.5-6.5	Low-----------	0.24	2	5	2-5
	6-35	1-8	1.45-1.70	0.6-6.0	0.08-0.15	4.5-6.5	Low-----------	0.20			
	35	---	---	---	---	---	--------------	----			
Westminster------	0-9	7-12	0.75-1.20	2.0-6.0	0.08-0.25	3.6-6.0	Low-----------	0.28	2	5	1-4
	9-18	2-10	0.90-1.40	2.0-6.0	0.08-0.28	3.6-6.0	Low-----------	0.32			
	18	---	---	---	---	---	--------------	----			
121C*:											
Millsite---------	0-6	7-12	1.00-1.25	0.6-6.0	0.12-0.16	4.5-6.5	Low-----------	0.24	2	5	2-5
	6-35	1-8	1.45-1.70	0.6-6.0	0.08-0.15	4.5-6.5	Low-----------	0.20			
	35	---	---	---	---	---	--------------	----			
Westminster------	0-9	7-12	0.75-1.20	2.0-6.0	0.08-0.25	3.6-6.0	Low-----------	0.28	2	5	1-4
	9-18	2-10	0.90-1.40	2.0-6.0	0.08-0.28	3.6-6.0	Low-----------	0.32			
	18	---	---	---	---	---	--------------	----			
Rock outcrop.											
122B*, 122C*:											
Tunbridge--------	0-3	7-12	0.80-1.20	0.6-6.0	0.14-0.23	3.6-6.0	Low-----------	0.24	2	5	2-8
	3-14	3-9	1.20-1.40	0.6-6.0	0.10-0.21	3.6-6.0	Low-----------	0.20			
	14-24	3-7	1.20-1.50	0.6-6.0	0.09-0.15	3.6-6.0	Low-----------	0.20			
	24	---	---	---	---	---	--------------	----			
Lyman------------	0-3	7-12	0.75-1.20	2.0-6.0	0.08-0.25	3.6-6.0	Low-----------	0.28	2	5	1-4
	3-19	2-10	0.90-1.40	2.0-6.0	0.08-0.28	3.6-6.0	Low-----------	0.32			
	19	---	---	---	---	---	--------------	----			
253B, 253C-------- Hinckley	0-8	4-8	0.90-1.10	6.0-20	0.05-0.12	3.6-6.0	Low-----------	0.20	3	8	2-7
	8-17	1-5	1.20-1.40	6.0-20	0.01-0.10	3.6-6.0	Low-----------	0.17			
	17-65	0-3	1.30-1.50	>20	0.01-0.06	3.6-6.0	Low-----------	0.10			
254A, 254B, 254C- Merrimac	0-9	3-7	1.10-1.20	2.0-6.0	0.14-0.19	3.6-6.0	Low-----------	0.24	3	3	1-5
	9-26	1-4	1.20-1.40	2.0-6.0	0.14-0.17	3.6-6.0	Low-----------	0.24			
	26-33	1-3	1.20-1.40	2.0-20.0	0.03-0.12	3.6-6.0	Low-----------	0.17			
	33-65	0-3	1.30-1.50	6.0-20	0.01-0.06	3.6-6.0	Low-----------	0.10			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
255B: Windsor	0-4	1-3	1.00-1.20	>6.0	0.09-0.12	4.5-6.0	Low	0.17	5	2	2-4
	4-22	0-3	1.30-1.55	>6.0	0.07-0.10	4.5-6.0	Low	0.17			
	22-65	0-2	1.40-1.65	>6.0	0.04-0.10	4.5-6.5	Low	0.10			
257E*:											
Hinckley	0-8	4-8	0.90-1.10	6.0-20	0.11-0.18	3.6-6.0	Low	0.20	3	8	2-7
	8-17	1-5	1.20-1.40	6.0-20	0.01-0.10	3.6-6.0	Low	0.17			
	17-65	0-3	1.30-1.50	>20	0.01-0.06	3.6-6.0	Low	0.10			
Windsor	0-4	1-3	1.00-1.20	>6.0	0.09-0.12	4.5-6.0	Low	0.17	5	2	2-4
	4-22	0-3	1.30-1.55	>6.0	0.07-0.10	4.5-6.0	Low	0.17			
	22-65	0-2	1.40-1.65	>6.0	0.04-0.10	4.5-6.5	Low	0.10			
260A, 260B: Sudbury	0-7	2-6	1.10-1.40	2.0-6.0	0.10-0.25	3.6-6.0	Low	0.24	3	3	2-6
	7-15	2-7	1.15-1.45	2.0-6.0	0.07-0.18	3.6-6.0	Low	0.24			
	15-25	0-4	1.25-1.45	2.0-20	0.01-0.15	3.6-6.0	Low	0.17			
	25-65	0-3	1.30-1.45	6.0-20	0.01-0.06	3.6-6.0	Low	0.10			
300B: Montauk	0-7	6-18	1.30-1.60	0.6-6.0	0.09-0.14	3.6-6.0	Low	0.24	3	3	3-6
	7-24	6-18	1.30-1.60	0.6-6.0	0.10-0.16	3.6-6.0	Low	0.24			
	24-65	1-18	1.70-1.90	0.06-0.6	0.02-0.08	3.6-6.0	Low	0.24			
305C: Paxton	0-5	3-12	1.00-1.25	0.6-2.0	0.10-0.20	4.5-6.0	Low	0.24	3	3	2-5
	5-18	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low	0.32			
	18-65	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low	0.24			
310B: Woodbridge	0-5	3-12	1.00-1.25	0.6-2.0	0.10-0.20	4.5-6.0	Low	0.24	3	3	2-6
	5-24	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low	0.32			
	24-65	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low	0.24			
315B: Scituate	0-10	4-10	1.00-1.30	0.6-2.0	0.11-0.21	3.6-6.0	Low	0.24	3	3	2-6
	10-23	2-9	1.25-1.50	0.6-2.0	0.09-0.16	4.5-6.0	Low	0.24			
	23-65	2-9	1.75-2.00	0.06-0.2	0.01-0.07	4.5-6.0	Low	0.24			
355B, 355C: Marlow	0-14	7-12	1.00-1.30	0.6-2.0	0.10-0.23	3.6-6.0	Low	0.24	3	5	2-6
	14-24	3-10	1.30-1.60	0.6-2.0	0.06-0.20	3.6-6.0	Low	0.32			
	24-65	3-10	1.70-2.05	0.06-0.6	0.05-0.12	3.6-6.0	Low	0.20			
360A, 360B, 360C: Peru	0-11	7-12	1.00-1.30	0.6-2.0	0.14-0.23	3.6-6.0	Low	0.24	3	5	2-6
	11-17	3-10	1.30-1.60	0.6-2.0	0.06-0.20	3.6-6.0	Low	0.32			
	17-65	3-10	1.60-2.05	0.06-0.6	0.05-0.12	3.6-6.0	Low	0.24			
370B, 370C: Shelburne	0-6	7-12	1.10-1.25	0.6-6.0	0.11-0.22	4.5-7.3	Low	0.28	3	5	1-4
	6-19	2-8	1.30-1.60	0.6-6.0	0.12-0.17	4.5-6.0	Low	0.32			
	19-65	2-8	1.70-1.95	0.06-0.2	0.04-0.11	5.1-6.0	Low	0.28			
375B, 375C: Ashfield	0-3	5-10	0.70-1.00	0.6-2.0	0.16-0.23	5.1-7.3	Low	0.32	3	3	3-8
	3-15	5-10	0.80-1.20	0.6-6.0	0.14-0.20	5.1-7.3	Low	0.37			
	15-65	7-14	1.60-1.80	0.06-0.2	0.06-0.12	5.6-7.3	Low	0.28			
600*. Pits											
903C*:											
Chatfield	0-4	7-18	1.10-1.40	0.6-6.0	0.08-0.14	4.5-6.0	Low	0.20	3	8	2-10
	4-27	7-18	1.20-1.50	0.6-6.0	0.08-0.18	4.5-6.0	Low	0.20			
	27	---	---	---	---	---	---	---			
Hollis	0-2	7-12	1.10-1.40	0.6-6.0	0.08-0.17	4.5-6.0	Low	0.20	1	8	1-4
	2-16	1-8	1.30-1.55	0.6-6.0	0.06-0.18	4.5-6.0	Low	0.32			
	16	---	---	---	---	---	---	---			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
904C*:											
Lyman-----------	0-3	7-12	0.75-1.20	2.0-6.0	0.11-0.23	3.6-6.0	Low-----------	0.20	2	8	1-4
	3-19	2-10	0.90-1.40	2.0-6.0	0.08-0.28	3.6-6.0	Low-----------	0.32			
	19	---	---	---	---	---	-------------	----			
Tunbridge-------	0-3	7-12	0.80-1.20	0.6-6.0	0.10-0.19	3.6-6.0	Low-----------	0.17	2	8	2-8
	3-14	3-9	1.20-1.40	0.6-6.0	0.10-0.21	3.6-6.0	Low-----------	0.20			
	14-24	3-7	1.20-1.50	0.6-6.0	0.09-0.15	5.1-6.5	Low-----------	0.20			
	24	---	---	---	---	---	-------------	----			
905C*:											
Peru------------	0-11	7-12	1.00-1.30	0.6-2.0	0.07-0.22	3.6-6.0	Low-----------	0.20	3	8	2-8
	11-17	3-10	1.30-1.60	0.6-2.0	0.06-0.20	3.6-6.0	Low-----------	0.32			
	17-65	3-10	1.60-2.05	0.06-0.6	0.05-0.12	3.6-6.0	Low-----------	0.24			
Marlow----------	0-14	7-12	1.00-1.30	0.6-2.0	0.08-0.15	3.6-6.0	Low-----------	0.20	3	8	2-8
	14-24	3-10	1.30-1.60	0.6-2.0	0.06-0.20	3.6-6.0	Low-----------	0.32			
	24-65	3-10	1.70-2.05	0.06-0.6	0.05-0.12	3.6-6.0	Low-----------	0.20			
909E*:											
Tunbridge-------	0-3	7-12	0.80-1.20	0.6-6.0	0.10-0.19	3.6-6.0	Low-----------	0.17	2	8	2-8
	3-14	3-9	1.20-1.40	0.6-6.0	0.10-0.21	3.6-6.0	Low-----------	0.20			
	14-24	3-7	1.20-1.50	0.6-6.0	0.09-0.15	5.1-6.5	Low-----------	0.20			
	24	---	---	---	---	---	-------------	----			
Lyman-----------	0-3	7-12	0.75-1.20	2.0-6.0	0.11-0.23	3.6-6.0	Low-----------	0.20	2	8	1-4
	3-19	2-10	0.90-1.40	2.0-6.0	0.08-0.28	3.6-6.0	Low-----------	0.32			
	19	---	---	---	---	---	-------------	----			
910C*:											
Woodbridge------	0-5	3-12	1.00-1.25	0.6-2.0	0.08-0.18	4.5-6.0	Low-----------	0.20	3	8	2-5
	5-24	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low-----------	0.32			
	24-60	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low-----------	0.24			
Paxton----------	0-5	3-12	1.00-1.25	0.6-2.0	0.08-0.18	4.5-6.0	Low-----------	0.20	3	8	2-5
	5-18	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low-----------	0.32			
	18-65	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low-----------	0.24			
911C*:											
Ashfield--------	0-3	5-10	0.70-1.00	0.6-2.0	0.16-0.23	5.1-7.3	Low-----------	0.32	3	8	3-8
	3-15	5-10	0.80-1.20	0.6-6.0	0.14-0.20	5.1-7.3	Low-----------	0.37			
	15-65	7-14	1.60-1.80	0.06-0.2	0.06-0.12	5.6-7.3	Low-----------	0.28			
Shelburne-------	0-6	2-8	1.10-1.25	0.6-6.0	0.11-0.22	4.5-7.3	Low-----------	0.28	3	8	1-4
	6-19	2-8	1.30-1.60	0.6-6.0	0.12-0.17	4.5-6.0	Low-----------	0.32			
	19-65	2-8	1.70-1.95	0.06-0.2	0.04-0.11	5.1-6.0	Low-----------	0.28			
912E*:											
Hollis----------	0-2	7-12	1.10-1.40	0.6-6.0	0.08-0.17	4.5-6.0	Low-----------	0.20	1	8	1-4
	2-16	1-8	1.30-1.55	0.6-6.0	0.06-0.18	4.5-6.0	Low-----------	0.32			
	16	---	---	---	---	---	-------------	----			
Chatfield-------	0-4	7-18	1.10-1.40	0.6-6.0	0.08-0.14	4.5-6.0	Low-----------	0.20	3	8	2-10
	4-27	7-18	1.20-1.50	0.6-6.0	0.08-0.18	4.5-6.0	Low-----------	0.20			
	27	---	---	---	---	---	-------------	----			
914E*:											
Marlow----------	0-14	7-12	1.00-1.30	0.6-2.0	0.08-0.15	3.6-6.0	Low-----------	0.20	3	8	3-8
	14-24	3-10	1.30-1.60	0.6-2.0	0.06-0.20	3.6-6.0	Low-----------	0.32			
	24-65	3-10	1.70-2.05	0.06-0.6	0.05-0.12	3.6-6.0	Low-----------	0.20			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
914E*:											
Berkshire-------	0-6	7-12	1.10-1.15	0.6-6.0	0.06-0.22	3.6-6.0	Low-----------	0.20	3	8	2-5
	6-18	3-10	1.15-1.30	0.6-6.0	0.10-0.20	3.6-6.0	Low-----------	0.32			
	18-65	1-10	1.30-1.60	0.6-6.0	0.10-0.18	3.6-6.0	Low-----------	0.24			
915E*:											
Montauk---------	0-7	7-18	1.00-1.25	0.6-6.0	0.09-0.14	3.6-6.0	Low-----------	0.24	3	8	3-6
	7-24	6-18	1.30-1.60	0.6-6.0	0.10-0.16	3.6-6.0	Low-----------	0.24			
	24-65	1-18	1.70-1.90	0.06-0.6	0.02-0.08	3.6-6.0	Low-----------	0.24			
Canton----------	0-3	1-8	0.90-1.20	2.0-6.0	0.13-0.17	3.6-6.0	Low-----------	0.20	3	8	1-6
	3-30	1-8	1.20-1.50	2.0-6.0	0.09-0.17	3.6-6.0	Low-----------	0.28			
	30-65	0-5	1.30-1.60	6.0-20	0.04-0.08	3.6-6.0	Low-----------	0.17			
916E*:											
Paxton----------	0-5	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low-----------	0.20	3	8	2-5
	5-18	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low-----------	0.24			
	18-65	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low-----------	0.24			
Charlton--------	0-8	3-12	1.00-1.25	0.6-2.0	0.08-0.18	4.5-6.0	Low-----------	0.20	3	8	2-5
	8-32	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low-----------	0.32			
	32-65	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low-----------	0.24			
919C*:											
Scituate--------	0-10	4-10	1.00-1.30	0.6-2.0	0.08-0.15	3.6-6.0	Low-----------	0.17	3	8	2-4
	10-23	2-9	1.25-1.50	0.6-2.0	0.09-0.16	4.5-6.0	Low-----------	0.24			
	23-65	2-5	1.75-2.00	0.06-0.2	0.01-0.07	4.5-6.0	Low-----------	0.24			
Montauk---------	0-7	7-18	1.00-1.25	0.6-6.0	0.09-0.14	3.6-6.0	Low-----------	0.24	3	8	3-6
	7-24	6-18	1.30-1.60	0.6-6.0	0.10-0.16	3.6-6.0	Low-----------	0.24			
	24-65	1-18	1.70-1.90	0.06-0.6	0.02-0.08	3.6-6.0	Low-----------	0.24			
920E*:											
Shelburne-------	0-6	7-12	1.10-1.25	0.6-6.0	0.11-0.22	4.5-7.3	Low-----------	0.28	3	8	1-4
	6-19	2-8	1.30-1.60	0.6-6.0	0.12-0.17	4.5-6.0	Low-----------	0.32			
	19-65	2-8	1.70-1.95	0.06-0.2	0.04-0.11	5.1-6.0	Low-----------	0.28			
Ashfield--------	0-3	5-10	0.70-1.00	0.6-2.0	0.16-0.23	5.1-7.3	Low-----------	0.32	3	8	3-8
	3-15	5-10	0.80-1.20	0.6-6.0	0.14-0.20	5.1-7.3	Low-----------	0.37			
	15-65	7-14	1.60-1.80	0.06-0.2	0.06-0.12	5.6-7.3	Low-----------	0.28			
921C*, 921E*:											
Westminster-----	0-9	7-12	0.75-1.20	2.0-6.0	0.08-0.25	3.6-6.0	Low-----------	0.28	2	8	1-4
	9-18	2-10	0.90-1.40	2.0-6.0	0.08-0.28	3.6-6.0	Low-----------	0.32			
	18	---	---	---	---	---	-------------	----			
Millsite--------	0-6	7-12	1.00-1.25	0.6-6.0	0.12-0.16	4.5-6.5	Low-----------	0.24	2	8	2-5
	6-35	1-8	1.45-1.70	0.6-6.0	0.08-0.15	4.5-6.5	Low-----------	0.20			
	35	---	---	---	---	---	-------------	----			
922B*:											
Pillsbury-------	0-5	7-12	1.00-1.30	0.6-2.0	0.06-0.21	4.5-5.5	Low-----------	0.20	3	8	4-8
	5-19	2-10	1.20-1.60	0.6-2.0	0.04-0.20	4.5-5.5	Low-----------	0.32			
	19-65	2-10	1.80-2.00	0.06-0.2	0.01-0.05	4.5-6.0	Low-----------	0.24			
Peacham---------	0-9	---	0.30-0.50	0.2-6.0	0.30-0.40	4.5-7.3	Low-----------	----	3	8	20-60
	9-15	3-10	1.20-1.40	0.6-2.0	0.11-0.22	4.5-7.3	Low-----------	0.28			
	15-65	3-10	1.80-2.00	<0.2	0.02-0.06	4.5-7.3	Low-----------	0.28			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
922B*:											
Wonsqueak-------	0-10	---	0.10-0.30	0.2-6.0	0.20-0.40	3.6-6.5	-------------	----	5	2	80-99
	10-27	---	0.10-0.30	0.2-6.0	0.20-0.40	4.5-6.5	-------------	----			
	27-65	5-30	1.50-1.70	0.2-2.0	0.06-0.16	5.1-7.3	Low----------	0.49			
923B*:											
Ridgebury-------	0-7	3-10	1.00-1.30	0.6-6.0	0.06-0.24	4.5-6.5	Low----------	0.20	3	8	4-7
	7-20	2-8	1.60-1.90	0.6-6.0	0.04-0.20	4.5-6.5	Low----------	0.32			
	20-65	2-8	1.80-2.00	<0.2	0.01-0.05	4.5-6.5	Low----------	0.24			
Whitman---------	0-8	7-12	1.10-1.30	0.6-6.0	0.15-0.25	4.5-6.5	Low----------	0.20	3	8	2-8
	8-10	2-4	1.60-1.85	0.6-6.0	0.10-0.17	4.5-6.5	Low----------	0.32			
	10-35	1-3	1.85-2.00	<0.2	0.03-0.04	4.5-6.5	Low----------	0.24			
	35-65	1-6	1.90-2.10	<0.2	0.02-0.03	4.5-6.5	Low----------	0.24			
Palms-----------	0-11	---	0.30-0.40	0.2-6.0	0.35-0.45	5.1-7.8	-------------	----	5	2	>75
	11-47	---	0.15-0.30	0.2-6.0	0.35-0.45	5.1-7.8	-------------	----			
	47-65	7-35	1.45-1.75	0.2-2.0	0.14-0.22	6.1-8.4	Low----------	0.37			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding," "water table," and terms such as "occasional," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth		Uncoated steel	Concrete
					Ft			In			
2 Pootatuck	B	Occasional	Brief	Nov-Apr	1.5-2.5	Apparent	Nov-Apr	>60	Moderate	Moderate	Moderate.
4 Rippowam	C	Frequent	Brief	Oct-May	0-1.5	Apparent	Sep-Jun	>60	High	High	High.
31 Walpole	C	None	---	---	0-1.0	Apparent	Nov-May	>60	High	Low	Moderate.
57 Lupton	A/D	None	---	---	+1-1.0	Apparent	Sep-May	>60	High	High	Low.
120B*:											
Millsite	B	None	---	---	>6.0	---	---	20-40	Low	Low	High.
Westminster	C/D	None	---	---	>6.0	---	---	10-20	Moderate	Low	High.
121C*:											
Millsite	B	None	---	---	>6.0	---	---	20-40	Low	Low	High.
Westminster	C/D	None	---	---	>6.0	---		10-20	Moderate	Low	High.
Rock outcrop.											
122B*, 122C*:											
Tunbridge	C	None	---	---	>6.0	---	---	20-40	Moderate	High	High.
Lyman	C/D	None	---	---	>6.0	---	---	10-20	Moderate	Low	High.
253B, 253C Hinckley	A	None	---	---	>6.0	---	---	>60	Low	Low	High.
254A, 254B, 254C Merrimac	A	None	---	---	>6.0	---	---	>60	Low	Low	High.
255B Windsor	A	None	---	---	>6.0	---	---	>60	Low	Low	High.
257E*:											
Hinckley	A	None	---	---	>6.0	---	---	>60	Low	Low	High.
Windsor	A	None	---	---	>6.0	---	---	>60	Low	Low	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
260A, 260B-------- Sudbury	B	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	>60	Moderate----	Low------	High.
300B-------------- Montauk	C	None--------	---	---	2.0-2.5	Perched	Feb-May	>60	Moderate----	Low------	High.
305C-------------- Paxton	C	None--------	---	---	1.5-2.5	Perched	Feb-Apr	>60	Moderate----	Low------	Moderate.
310B-------------- Woodbridge	C	None--------	---	---	1.5-2.5	Perched	Nov-May	>60	High--------	Low------	Moderate.
315B-------------- Scituate	C	None--------	---	---	1.5-3.0	Perched	Nov-May	>60	Moderate----	Low------	High.
355B, 355C-------- Marlow	C	None--------	---	---	[illegible].0-3.5	Perched	Mar-Apr	>60	Moderate----	Low------	Moderate.
360A, 360B, 360C-- Peru	C	None--------	---	---	1.5-2.5	Perched	Nov-May	>60	High--------	Moderate	Moderate.
370B, 370C-------- Shelburne	C	None--------	---	---	1.5-2.5	Perched	Feb-Apr	>65	Moderate----	Moderate	Moderate.
375B, 375C-------- Ashfield	C	None--------	---	---	1.0-2.0	Perched	Jan-May	>60	High--------	Moderate	Moderate.
600*. Pits											
903C*:											
Chatfield--------	B	None--------	---	---	>6.0	---	---	20-40	Moderate----	Low------	Moderate.
Hollis-----------	C/D	None--------	---	---	>6.0	---	---	10-20	Moderate----	Low------	High.
904C*:											
Lyman------------	C/D	None--------	---	---	>6.0	---	---	10-20	Moderate----	Low------	High.
Tunbridge--------	C	None--------	---	---	>6.0	---	---	20-40	Moderate----	High-----	High.
905C*:											
Peru-------------	C	None--------	---	---	1.5-2.5	Perched	Nov-May	>60	High--------	Moderate	Moderate.
Marlow-----------	C	None--------	---	---	2.0-3.5	Perched	Mar-Apr	>60	Moderate----	Low------	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
909E*:											
Tunbridge	C	None	---	---	>6.0	---	---	20-40	Moderate	High	High.
Lyman	C/D	None	---	---	>6.0	---	---	10-20	Moderate	Low	High.
910C*:											
Woodbridge	C	None	---	---	1.5-2.5	Perched	Nov-May	>60	High	Low	Moderate.
Paxton	C	None	---	---	1.5-2.5	Perched	Feb-Apr	>60	Moderate	Low	Moderate.
911C*:											
Ashfield	C	None	---	---	1.0-2.0	Perched	Jan-May	>60	High	Moderate	Moderate.
Shelburne	C	None	---	---	1.5-2.5	Perched	Feb-Apr	>65	Moderate	Moderate	Moderate.
912E*:											
Hollis	C/D	None	---	---	>6.0	---	---	10-20	Moderate	Low	High.
Chatfield	B	None	---	---	>6.0	---	---	20-40	Moderate	Low	Moderate.
914E*:											
Marlow	C	None	---	---	2.0-3.5	Perched	Mar-Apr	>60	Moderate	Low	Moderate.
Berkshire	B	None	---	---	>6.0	---	---	>60	Moderate	Low	High.
915E*:											
Montauk	C	None	---	---	2.0-2.5	Perched	Feb-May	>60	Moderate	Low	High.
Canton	B	None	---	---	>6.0	---	---	>60	Low	Low	High.
916E*:											
Paxton	B	None	---	---	>6.0	---	---	>60	Low	Low	High.
Charlton	C	None	---	---	1.5-2.5	Perched	Feb-Apr	>60	Moderate	Low	Moderate.
919C*:											
Scituate	C	None	---	---	1.5-3.0	Perched	Nov-May	>60	Moderate	Low	High.
Montauk	C	None	---	---	2.0-2.5	Perched	Feb-May	>60	Moderate	Low	High.
920E*:											
Shelburne	C	None	---	---	1.5-2.5	Perched	Feb-Apr	>65	Moderate	Moderate	Moderate.
Ashfield	C	None	---	---	1.0-2.0	Perched	Jan-May	>60	High	Moderate	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth		Uncoated steel	Concrete
					Ft			In			
921C*, 921E*:											
Westminster------	C/D	None--------	---	---	>6.0	---	---	10-20	Moderate----	Low------	High.
Millsite---------	B	None--------	---	---	>6.0	---	---	20-40	Low---------	Low------	High.
922B*:											
Pillsbury--------	C	None--------	---	---	0-1.5	Perched	Nov-May	>60	High--------	High-----	High.
Peacham----------	D	None--------	---	---	+1-0.5	Apparent	Oct-Jun	>60	High--------	Moderate	High.
Wonsqueak--------	D	None--------	---	---	+1-0.5	Apparent	Sep-Jul	>60	High--------	Moderate	Moderate.
923B*:											
Ridgebury--------	C	None--------	---	---	0-0.5	Perched	Nov-May	>60	High--------	High-----	High.
Whitman----------	D	None--------	---	---	+1-0.5	Perched	Sep-Jun	>60	High--------	High-----	High.
Palms------------	A/D	None--------	---	---	+1-1.0	Apparent	Nov-May	>60	High--------	High-----	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Ashfield	Coarse-loamy, mixed, frigid Aquic Dystric Eutrochrepts
Berkshire	Coarse-loamy, mixed, frigid Typic Haplorthods
Canton	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts
Charlton	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Chatfield	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Hinckley	Sandy-skeletal, mixed, mesic Typic Udorthents
Hollis	Loamy, mixed, mesic Lithic Dystrochrepts
Lupton	Euic Typic Borosaprists
Lyman	Loamy, mixed, frigid Lithic Haplorthods
Marlow	Coarse-loamy, mixed, frigid Typic Haplorthods
Merrimac	Sandy, mixed, mesic Typic Dystrochrepts
Millsite	Coarse-loamy, mixed, frigid Typic Dystrochrepts
Montauk	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Palms	Loamy, mixed, euic, mesic Terric Medisaprists
Paxton	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Peacham	Coarse-loamy, mixed, nonacid, frigid Histic Humaquepts
Peru	Coarse-loamy, mixed, frigid Aquic Haplorthods
Pillsbury	Coarse-loamy, mixed, acid, frigid Aeric Haplaquepts
Pootatuck	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Ridgebury	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Rippowam	Coarse-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Scituate	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Shelburne	Coarse-loamy, mixed, frigid Typic Fragiochrepts
Sudbury	Sandy, mixed, mesic Aquic Dystrochrepts
Tunbridge	Coarse-loamy, mixed, frigid Typic Haplorthods
Walpole	Sandy, mixed, mesic Aeric Haplaquepts
Westminster	Loamy, mixed, frigid Lithic Haplorthods
Whitman	Coarse-loamy, mixed, nonacid, mesic Typic Humaquepts
Windsor	Mixed, mesic Typic Udipsamments
Wonsqueak	Loamy, mixed, euic Terric Borosaprists
Woodbridge	Coarse-loamy, mixed, mesic Aquic Dystrochrepts

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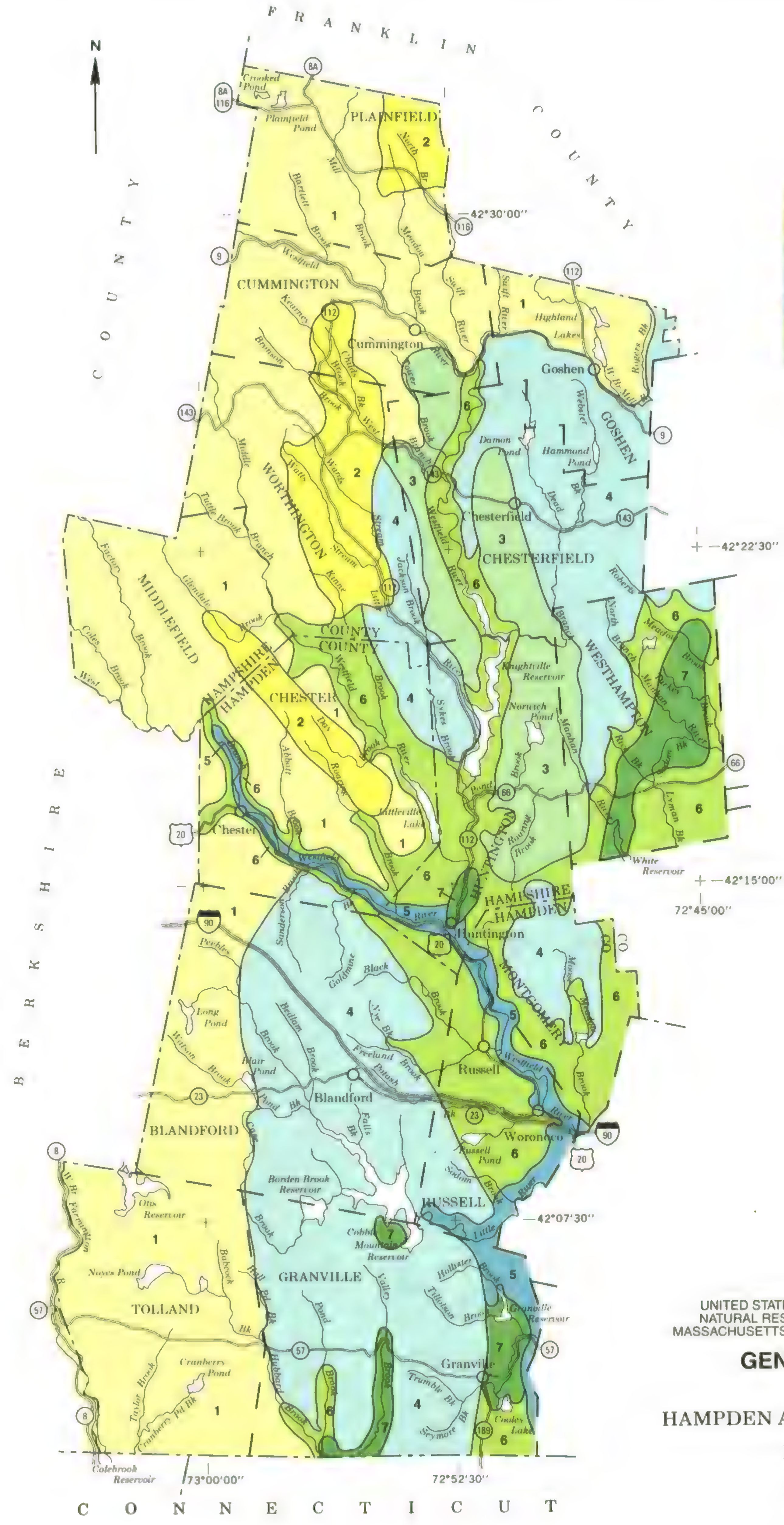


SOIL LEGEND*

1	LYMAN-TUNBRIDGE-PERU
2	PERU-MARLOW
3	WESTMINSTER-MILLSITE
4	ASHFIELD-SHELBURNE
5	CHATFIELD-HOLLIS-MONTAUK
6	MONTAUK-PAXTON-SCITUATE
7	MERRIMAC-HINCKLEY

*The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1995

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

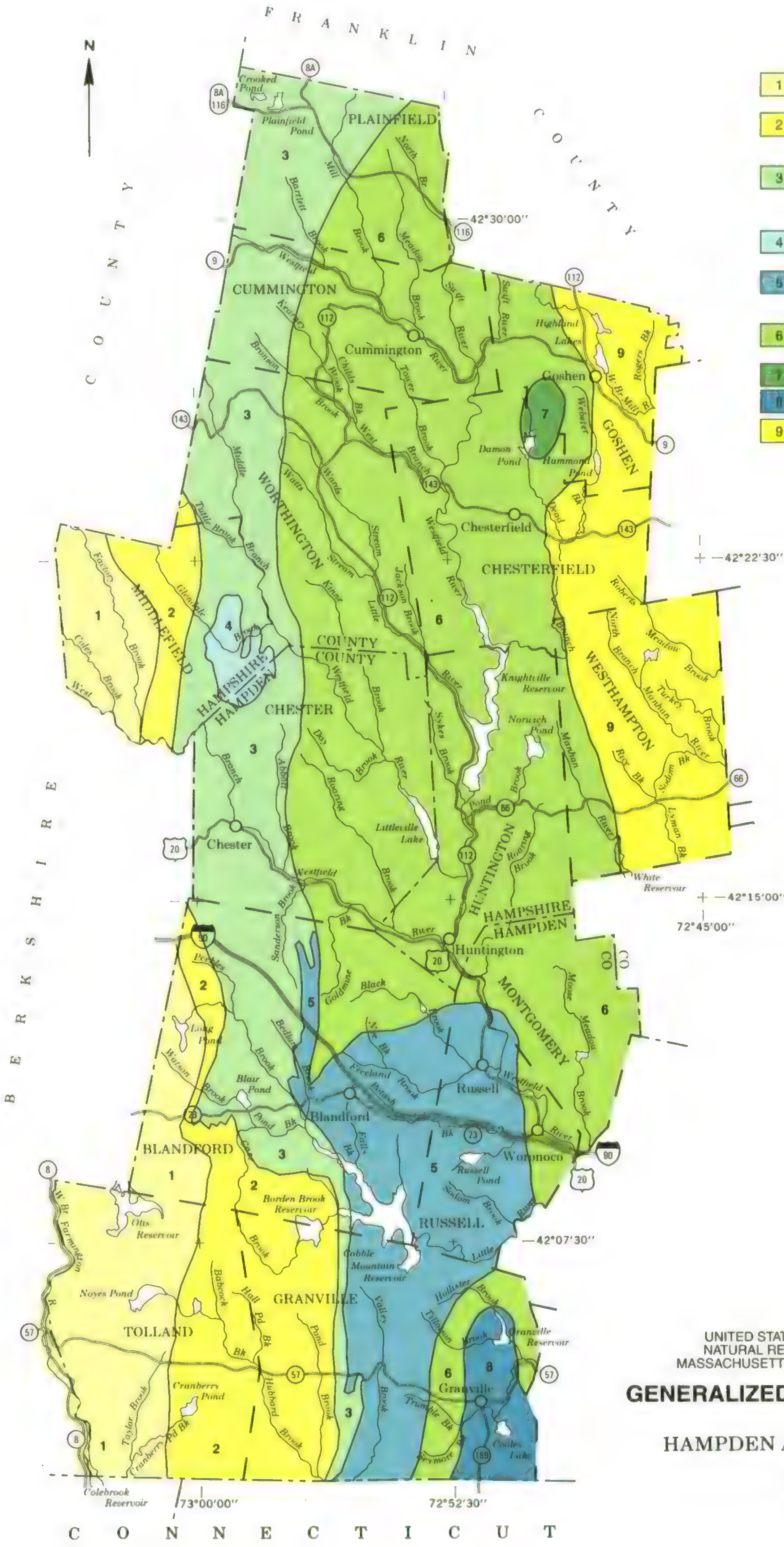
HAMPDEN AND HAMPSHIRE COUNTIES
MASSACHUSETTS
WESTERN PART

Scale 1:190,080

1 0 1 2 3 Mi

1 0 3 6 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



LEGEND*

1	PROTEROZOIC ROCKS - (SCHIST AND GNEISS)
2	HOOSAC FORMATION - (QUARTZ AND MICA-RICH SCHIST AND GNEISS)
3	ROWE-HAWLEY ZONE - (CARBONACEOUS QUARTZ-RICH SCHISTS, AMPHIBOLITIES, AND GNEISSES)
4	MIDDLEFIELD GRANITE - (BIOTITE-MUSCOVITE GRANITE)
5	COBBLE MOUNTAIN FORMATION - (INTERBEDDED SCHISTS AND GNEISSES)
6	GOSHEN FORMATION - (CARBONACEOUS SCHIST AND MICACEOUS QUARTZITE)
7	GOSHEN DOME - (GNEISS)
8	GRANVILLE DOME - (GNEISS)
9	WAITS RIVER FORMATION - (SCHIST WITH MINOR AMOUNTS OF LIMESTONE)

*The units on this legend are described in the text under the heading "Geology."

Compiled 1995

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION

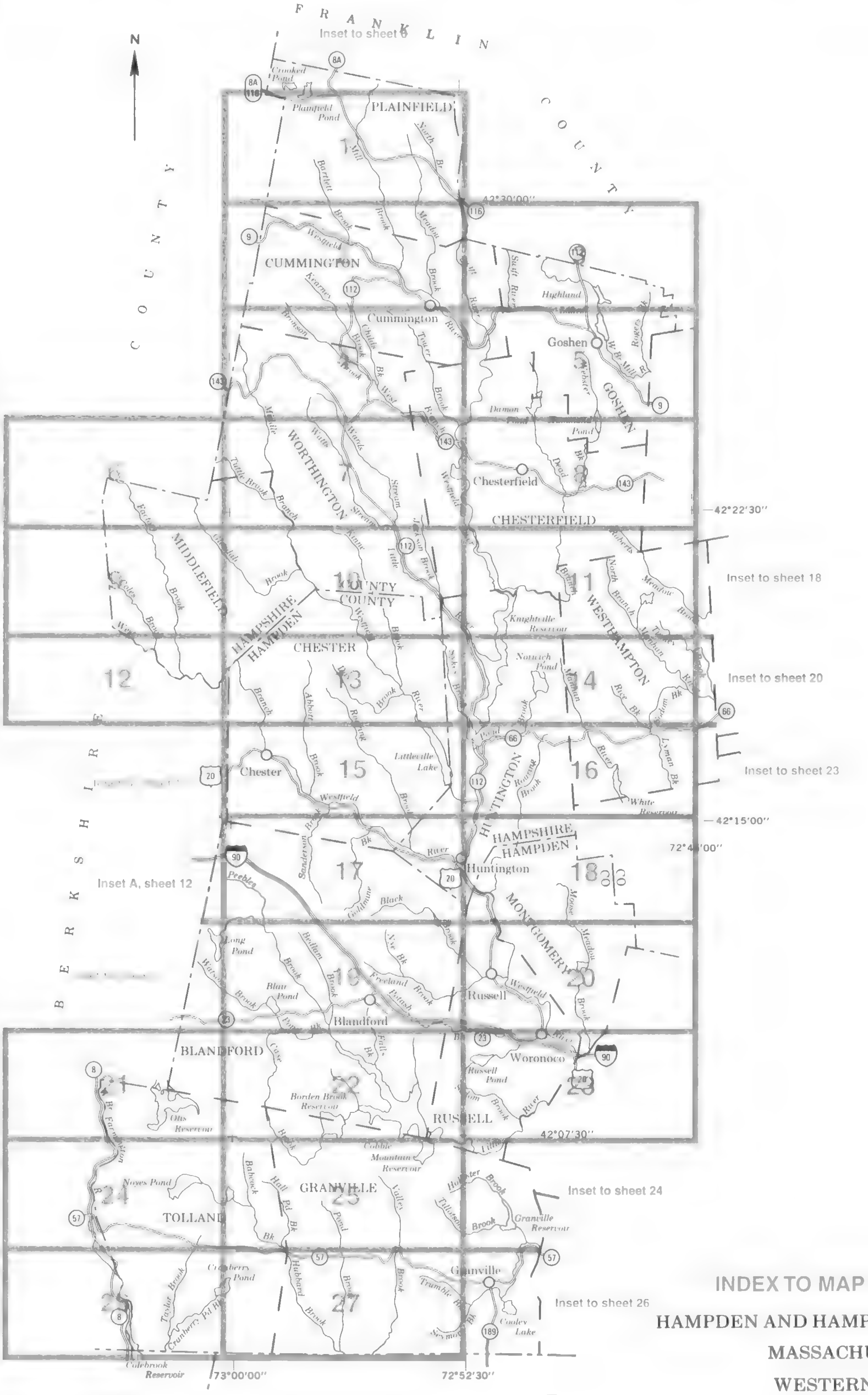
GENERALIZED BEDROCK GEOLOGY MAP

HAMPDEN AND HAMPSHIRE COUNTIES
MASSACHUSETTS
WESTERN PART

Scale 1:190,080

1 0 1 2 3 Mi

1 0 3 6 Km



INDEX TO MAP SHEETS

HAMPDEN AND HAMPSHIRE COUNTIES MASSACHUSETTS WESTERN PART

Scale 1:190,080

SOIL LEGEND

Map publication symbols consist of numbers or a combination of numbers followed by a letter. The numbers represent the soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope class letter are for nearly level soils or for miscellaneous areas.

SYMBOL	NAME
2	Pootatuck fine sandy loam
4	Rippowam very fine sandy loam
31	Walpole fine sandy loam
57	Lupton muck
120B	Millsite-Westminster complex, 3 to 8 percent slopes, very rocky
121C	Millsite-Westminster-Rock outcrop complex, 8 to 15 percent slopes
122B	Tunbridge-Lyman complex, 3 to 8 percent slopes
122C	Tunbridge-Lyman complex, 8 to 15 percent slopes
253B	Hinckley very gravelly sandy loam, 3 to 8 percent slopes
253C	Hinckley very gravelly sandy loam, 8 to 15 percent slopes
254A	Merrimac fine sandy loam, 0 to 3 percent slopes
254B	Merrimac fine sandy loam, 3 to 8 percent slopes
254C	Merrimac fine sandy loam, 8 to 15 percent slopes
255B	Windsor loamy fine sand, 1 to 5 percent slopes
257E	Hinckley and Windsor soils, steep
260A	Sudbury fine sandy loam 0 to 3 percent slopes
260B	Sudbury fine sandy loam, 3 to 8 percent slopes
300B	Montauk fine sandy loam, 3 to 8 percent slopes
305C	Paxton fine sandy loam, 8 to 15 percent slopes
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes
315B	Scituate fine sandy loam, 3 to 8 percent slopes
355B	Marlow loam, 3 to 8 percent slopes
355C	Marlow loam, 8 to 15 percent slopes
360A	Peru loam, 0 to 3 percent slopes
360B	Peru loam, 3 to 8 percent slopes
360C	Peru loam, 8 to 15 percent slopes
370B	Shelburne loam, 3 to 8 percent slopes
370C	Shelburne loam, 8 to 15 percent slopes
375B	Ashfield fine sandy loam, 3 to 8 percent slopes
375C	Ashfield fine sandy loam, 8 to 15 percent slopes
60u	Pits, gravel
903C	Chatfield-Hollis association, rolling, extremely stony
904C	Lyman-Tunbridge association, rolling, extremely stony
905C	Peru-Marlow association, rolling, extremely stony
909E	Tunbridge-Lyman association, steep, extremely stony
910C	Woodbridge-Paxton association, rolling, extremely stony
911C	Ashfield-Shelburne association, rolling, extremely stony
912E	Hollis-Chatfield association, steep, extremely stony
914E	Marlow-Berkshire association, steep, extremely stony
915E	Montauk-Canton association, steep, extremely stony
916E	Paxton-Charlton association, steep, extremely stony
919C	Scituate-Montauk association, rolling, extremely stony
920E	Shelburne-Ashfield association, steep, extremely stony
921C	Westminster-Millsite association, rolling, extremely stony
921E	Westminster-Millsite association, steep, extremely stony
922B	Pillsbury-Peacham-Wonsqueak association, undulating, extremely stony
923B	Ridgebury-Whitman-Palms association, undulating, extremely stony

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 173
- Federal — 287
- State — 52
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE
(normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small (Named where applicable) — water

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban area) (occupied)
- Church
- School
- Indian mound (label)
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water
- Intermittent Reservoir

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 2 253C

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

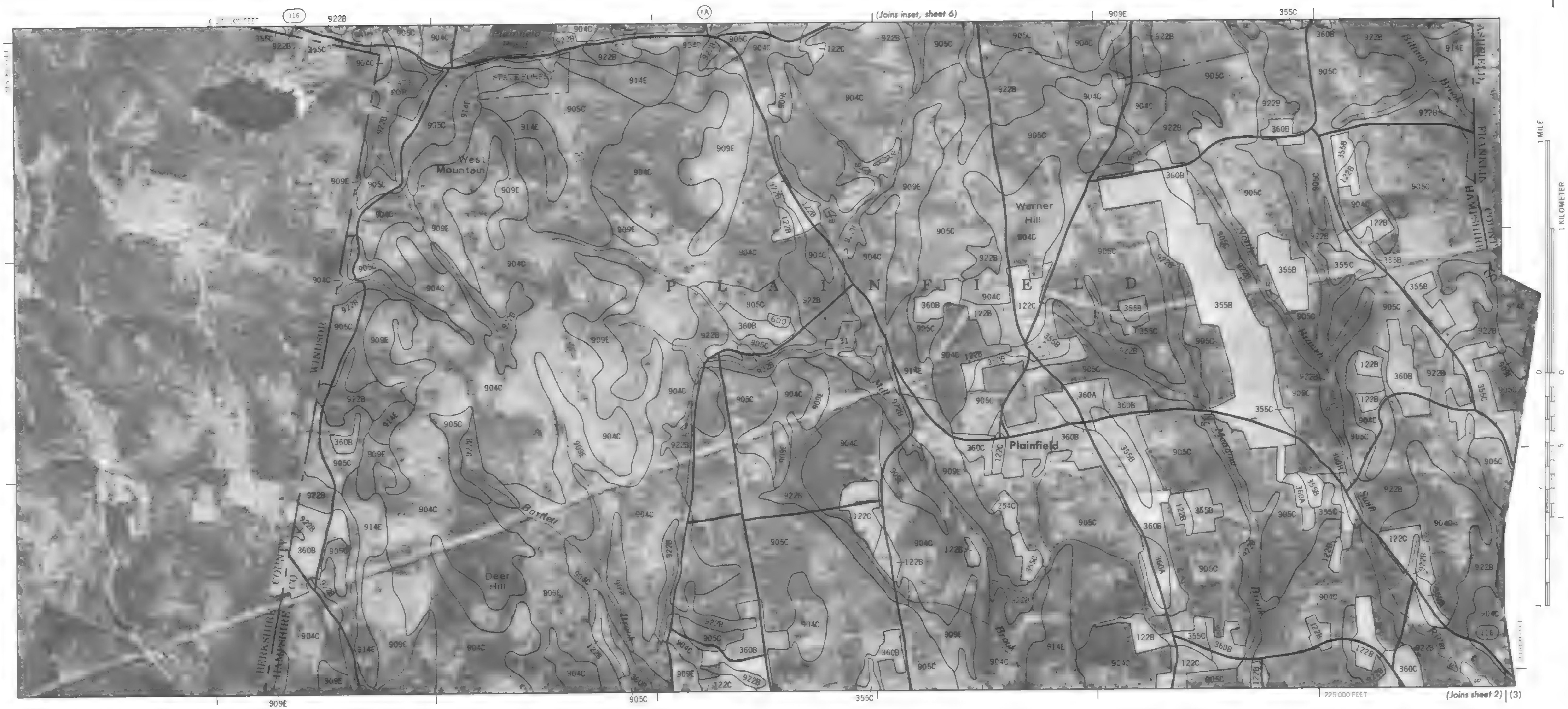
SOIL SAMPLE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

1

N



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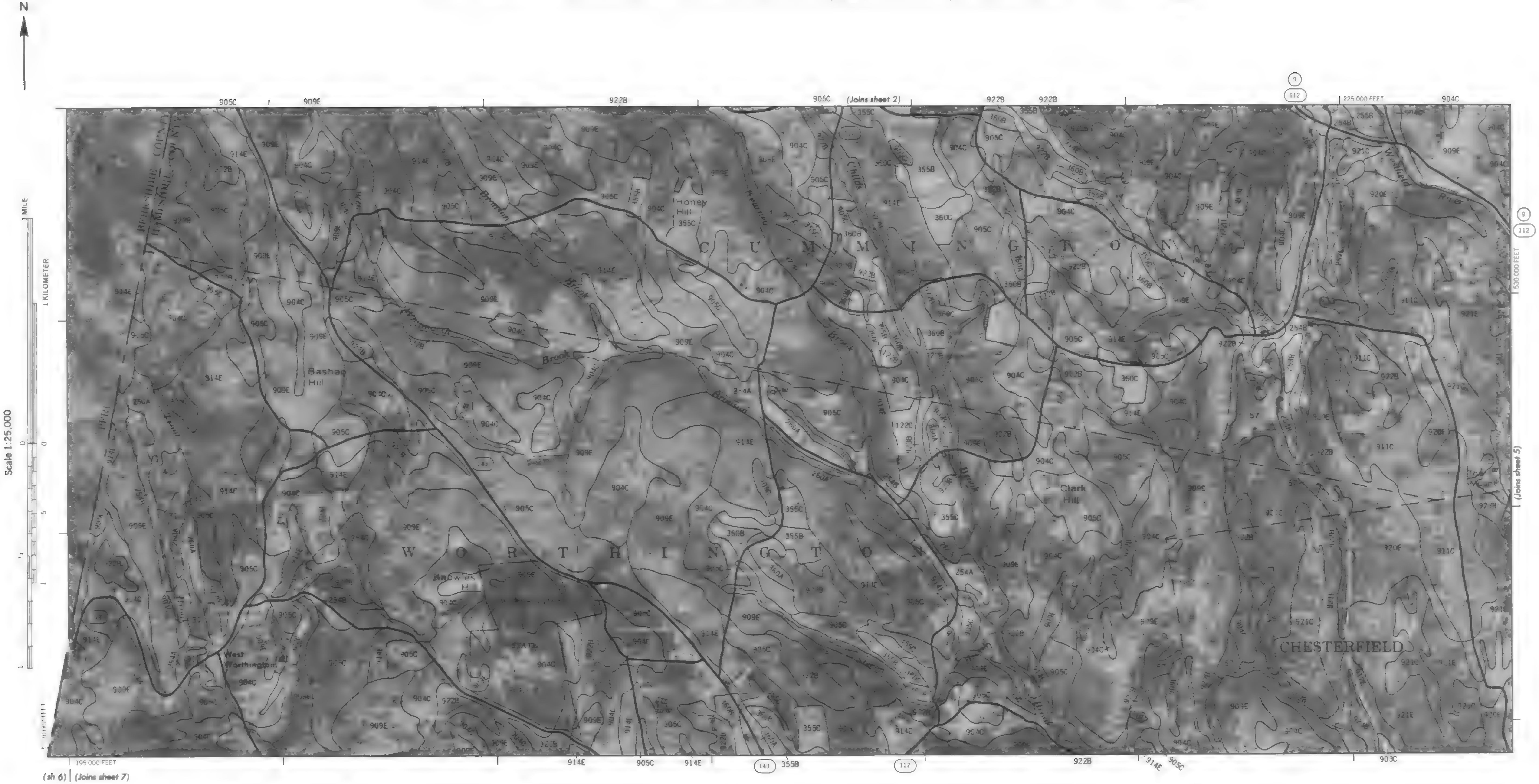
4

SOIL SURVEY OF HAMPDEN AND HAMPSHIRE COUNTIES, MASSACHUSETTS, WESTERN PART — SHEET NUMBER 4



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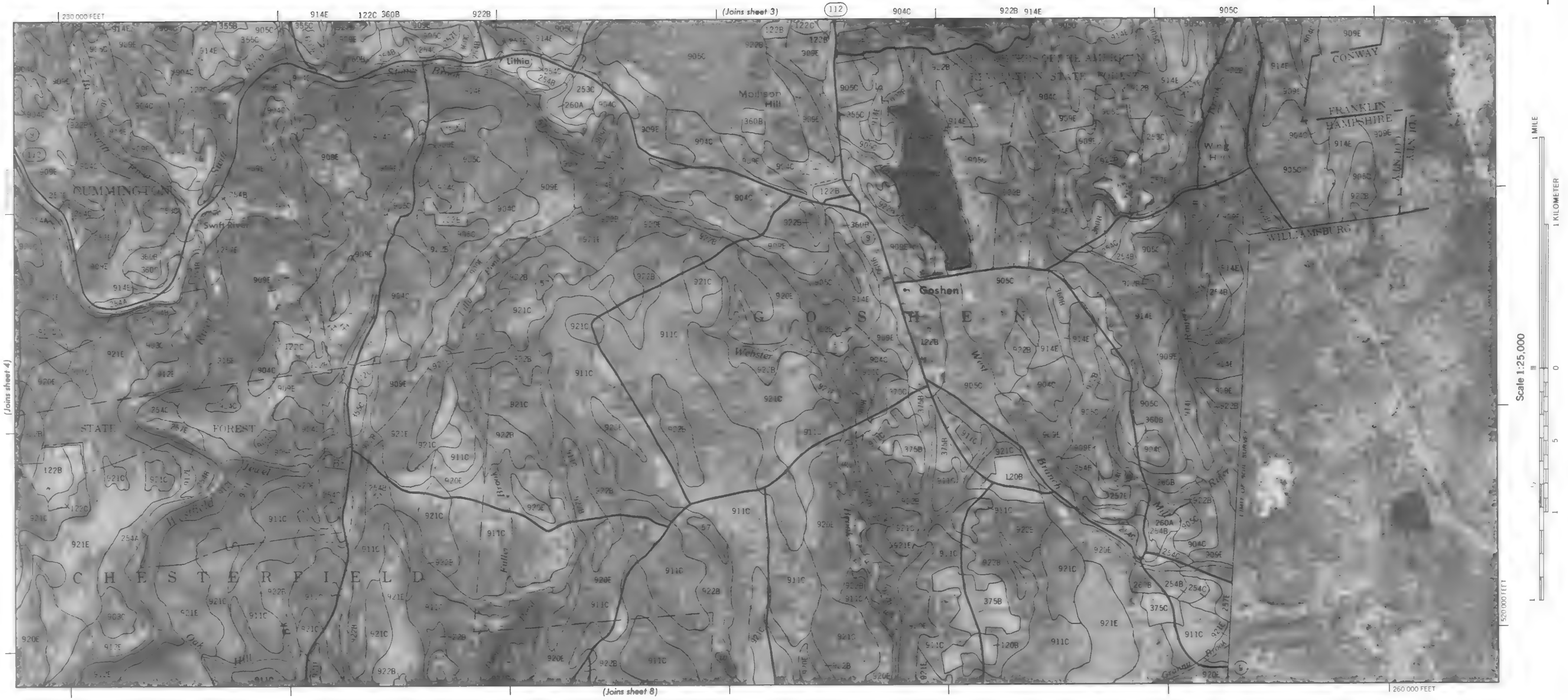
5

N



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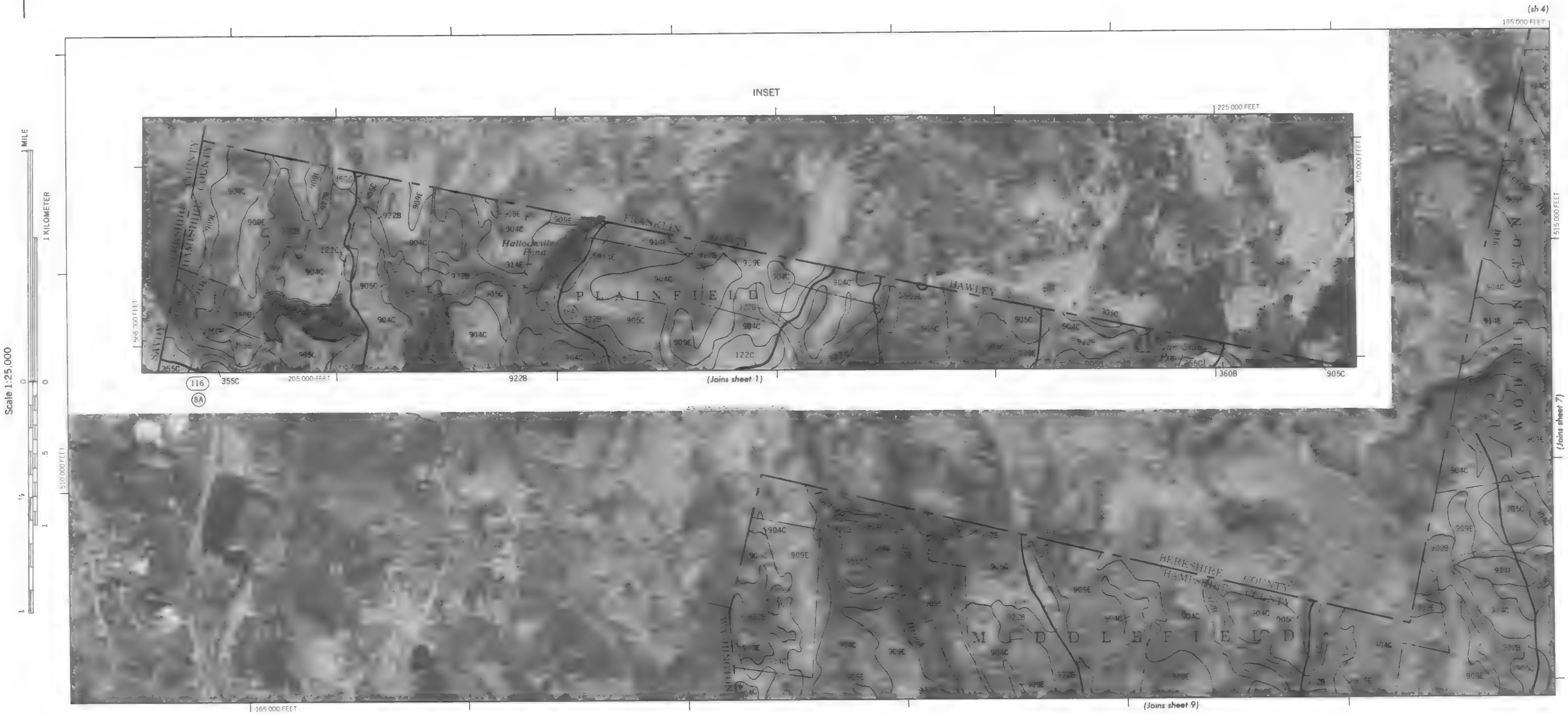

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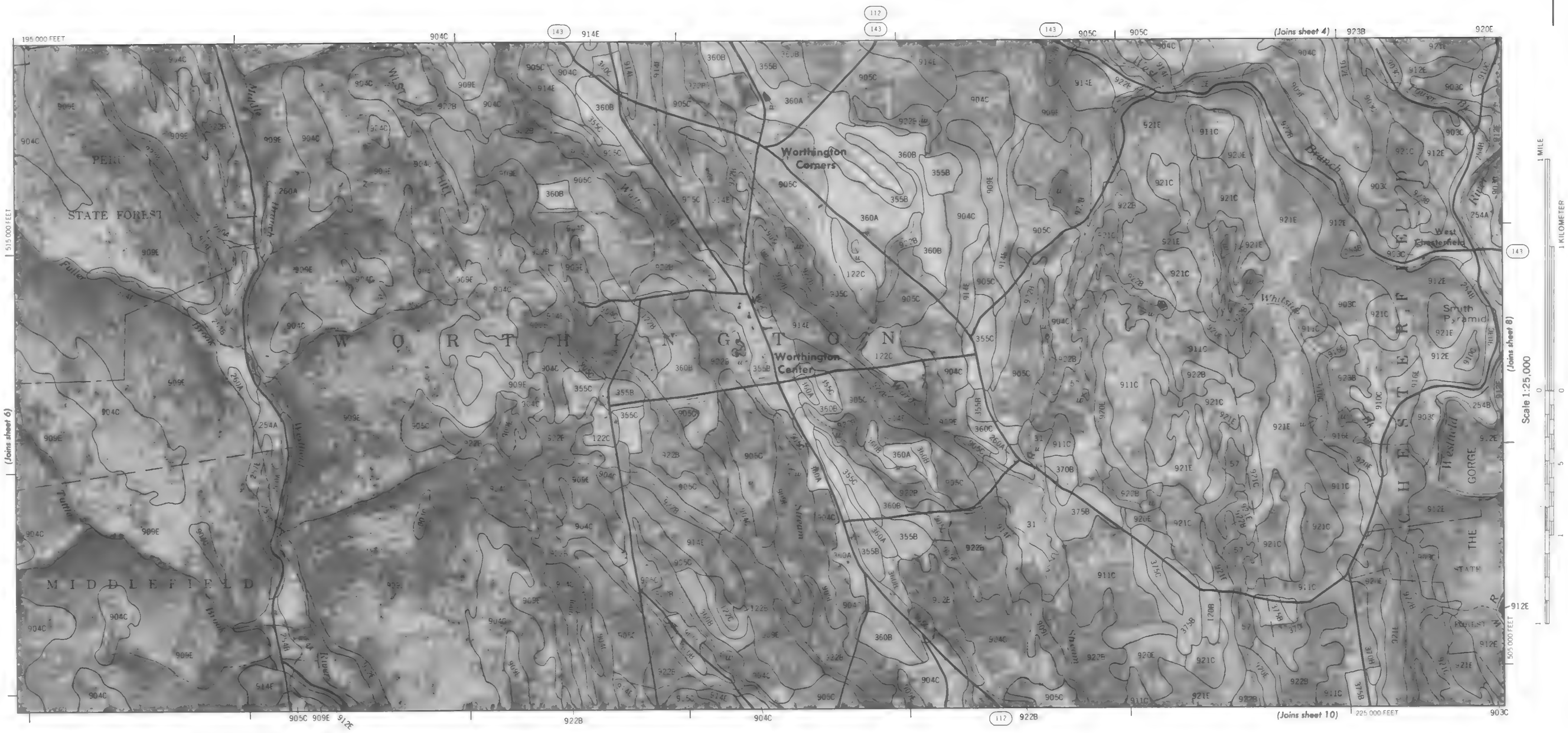

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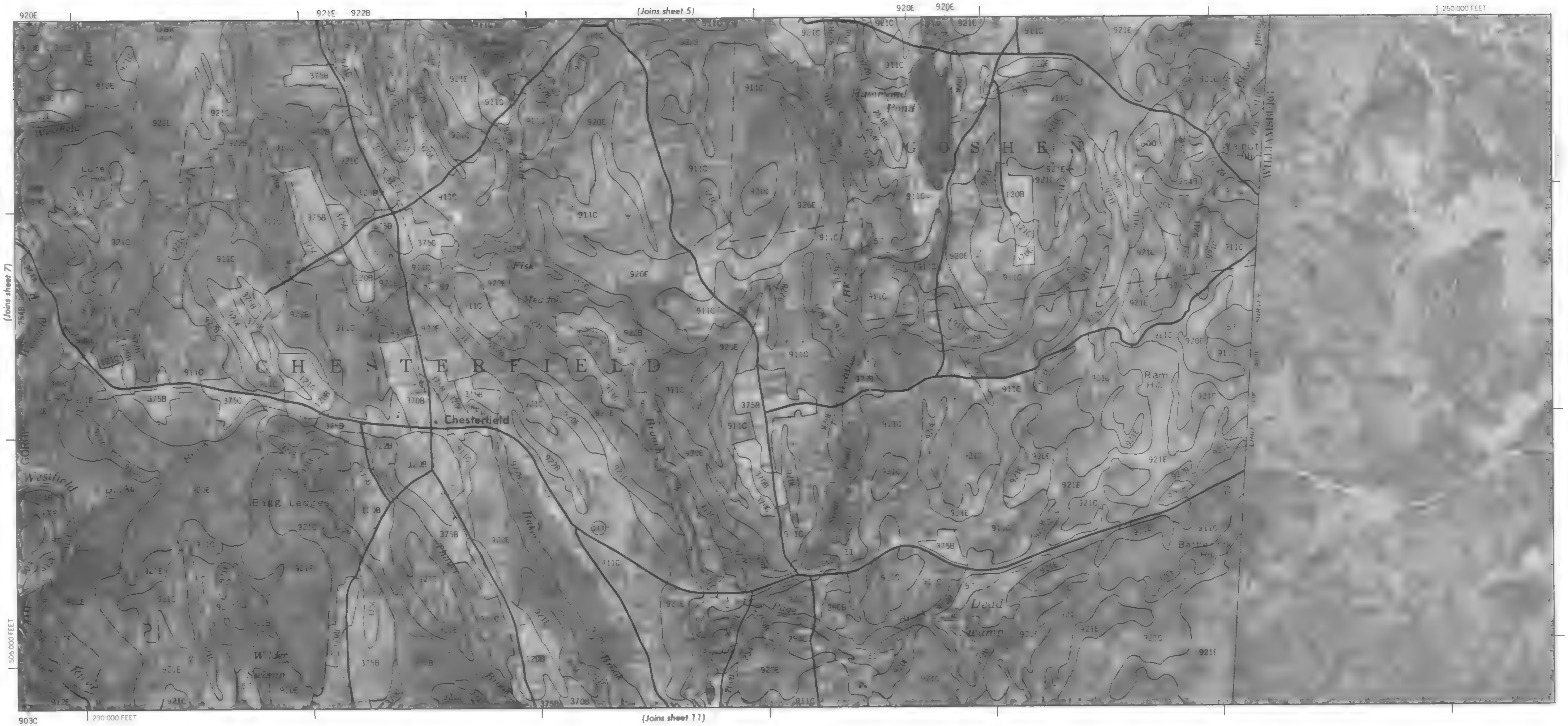
SOIL SURVEY OF HAMPDEN AND HAMPSHIRE COUNTIES, MASSACHUSETTS, WESTERN PART — SHEET NUMBER 8

N

Scale 1:25,000



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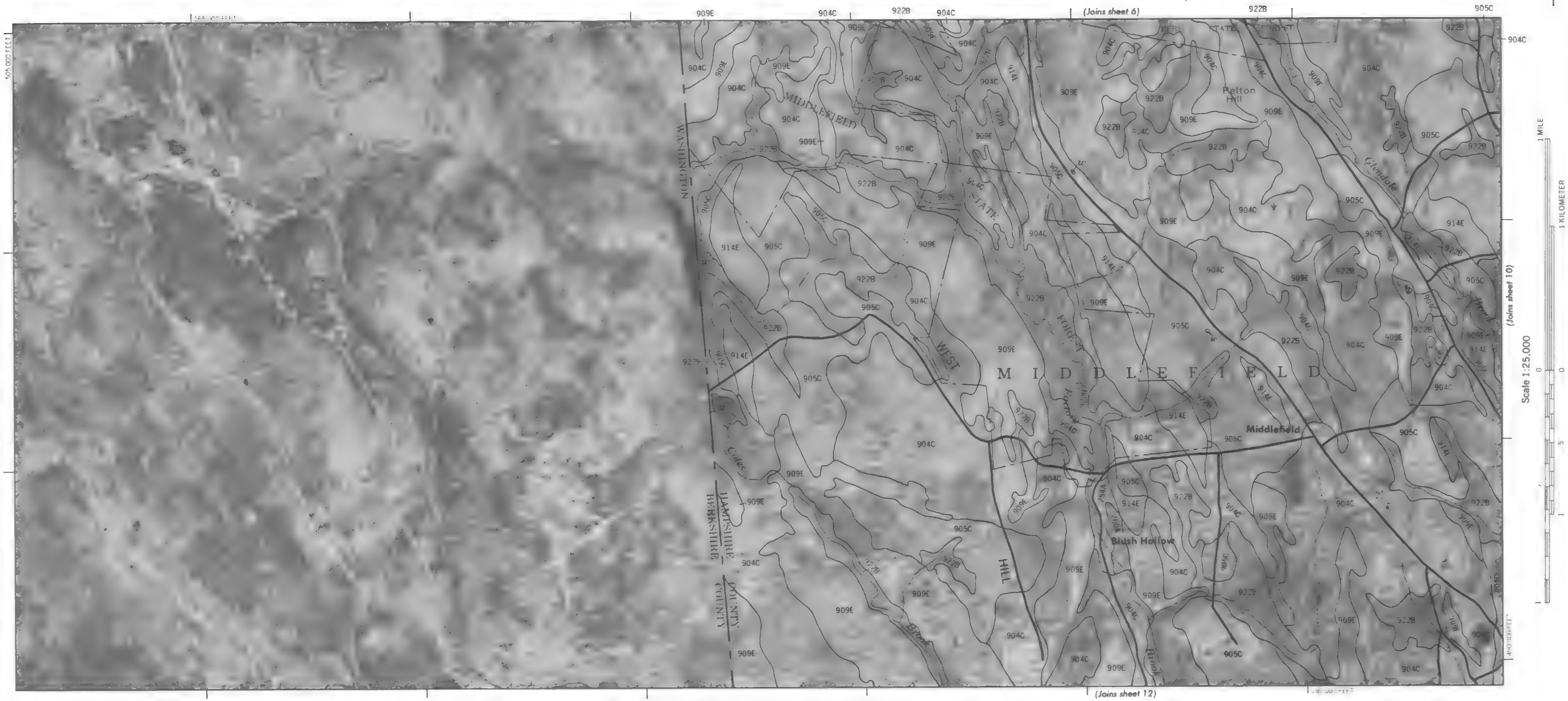

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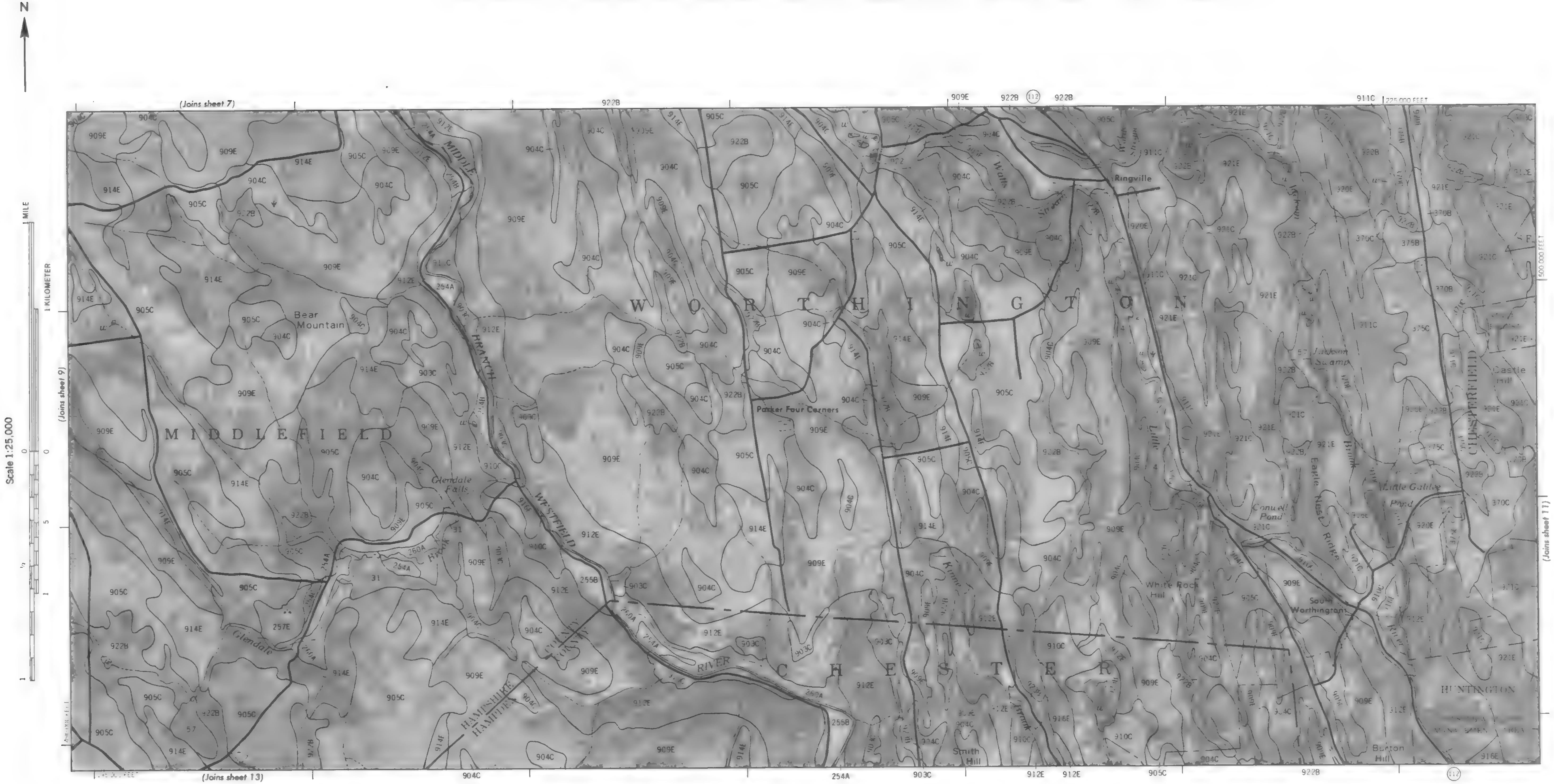
SOIL SURVEY OF HAMPDEN AND HAMPSHIRE COUNTIES, MASSACHUSETTS, WESTERN PART — SHEET NUMBER 10



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N

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SOIL SURVEY OF HAMPDEN AND HAMPSHIRE COUNTIES, MASSACHUSETTS, WESTERN PART — SHEET NUMBER 12

N

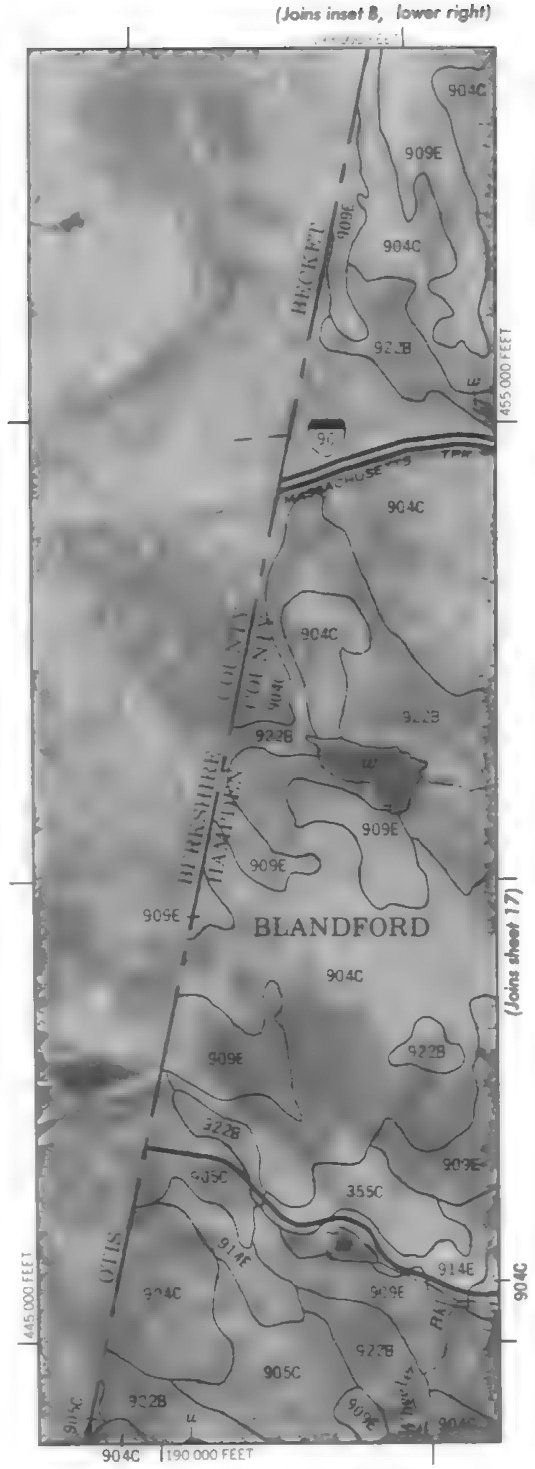
Scale 1:25,000

1 MILE

1 KILOMETER

INSET A

(Joins inset B, lower right)

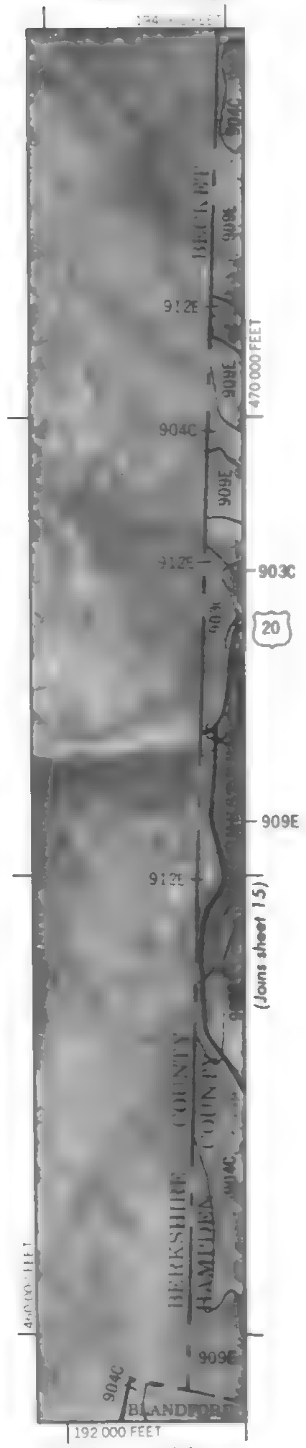


(Joins inset, sheet 21)

3000 AND 5000-FOOT GRID TICKS

INSET B

(Joins lower right)



(Joins upper left)

2000 AND 5000-FOOT GRID TICKS

(Joins sheet 9)

(Joins inset B, upper left)

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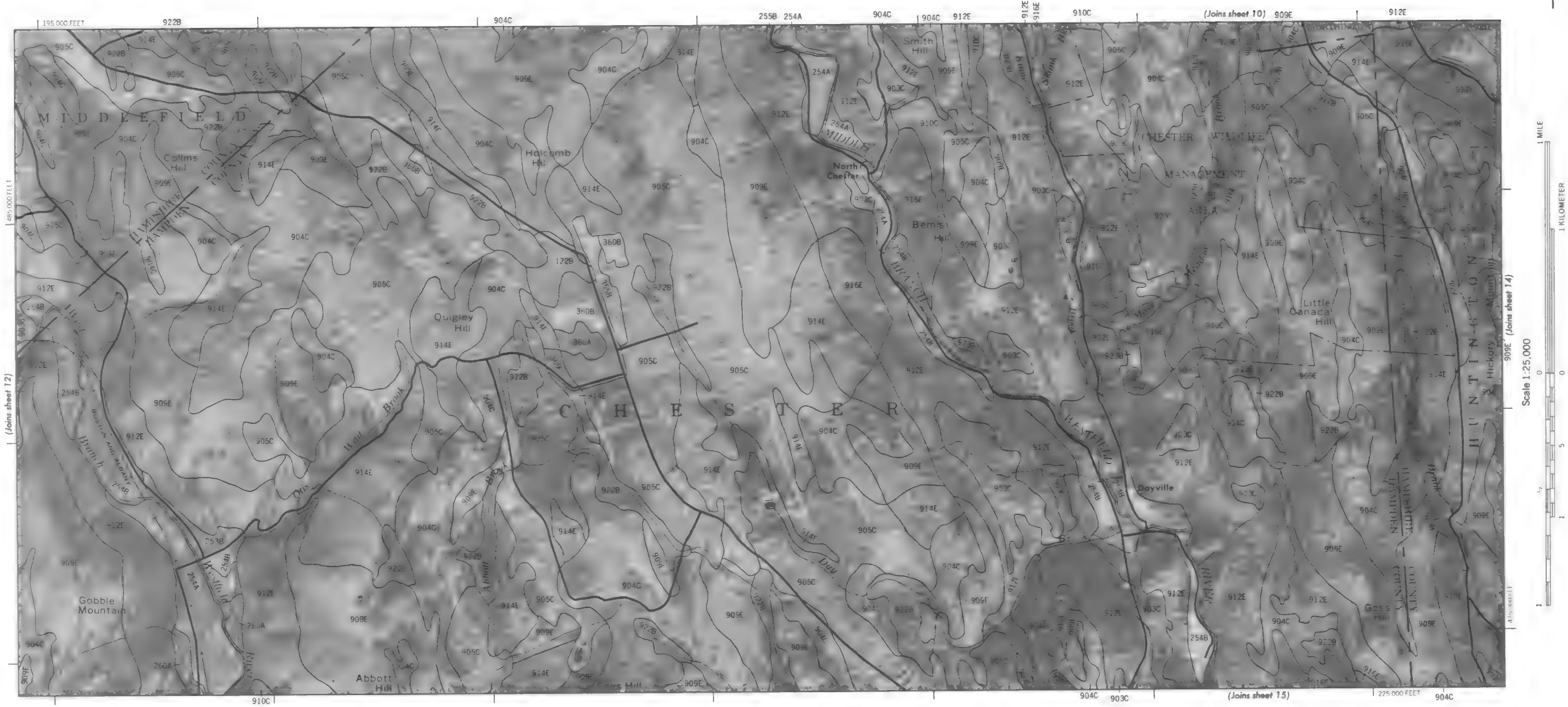

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SOIL SURVEY OF HAMPDEN AND HAMPSHIRE COUNTIES, MASSACHUSETTS, WESTERN PART — SHEET NUMBER 14

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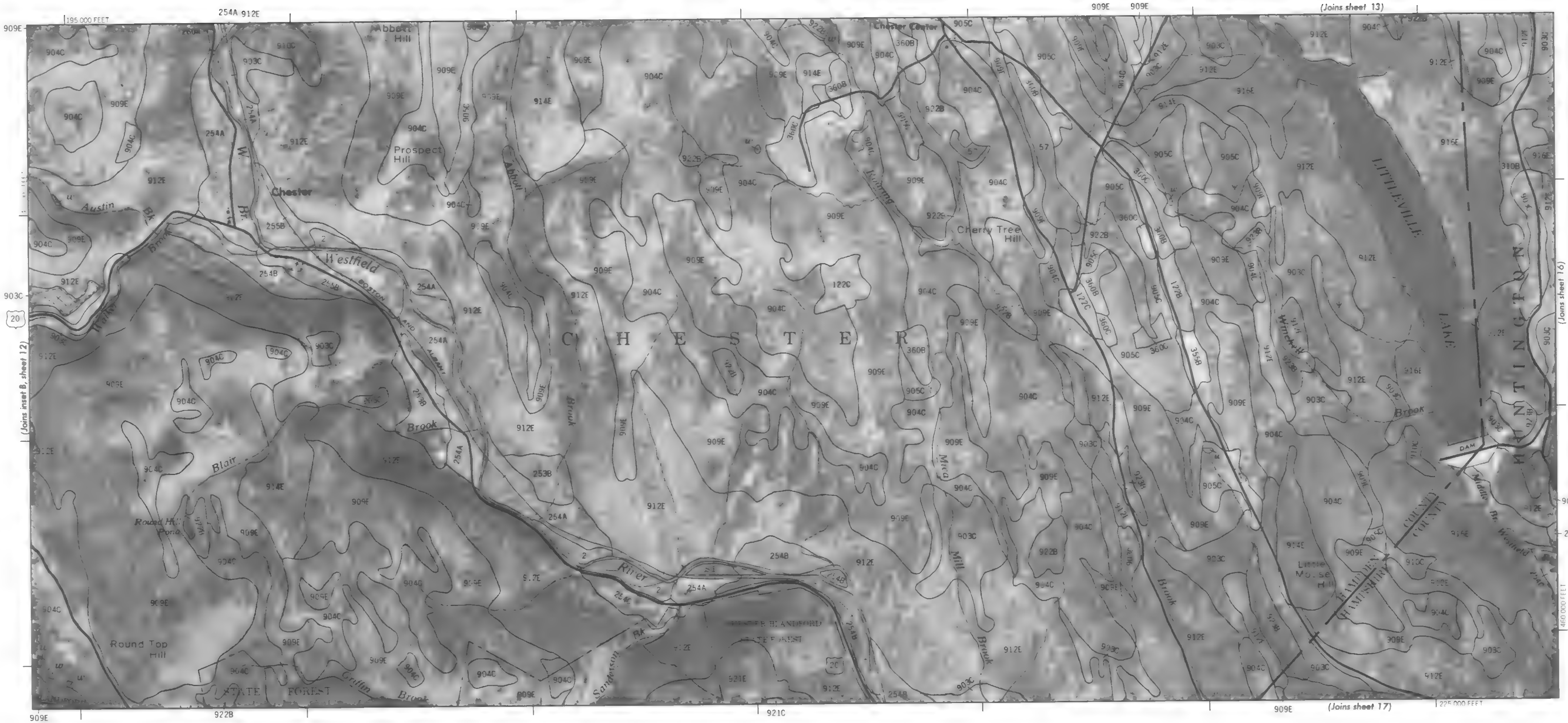
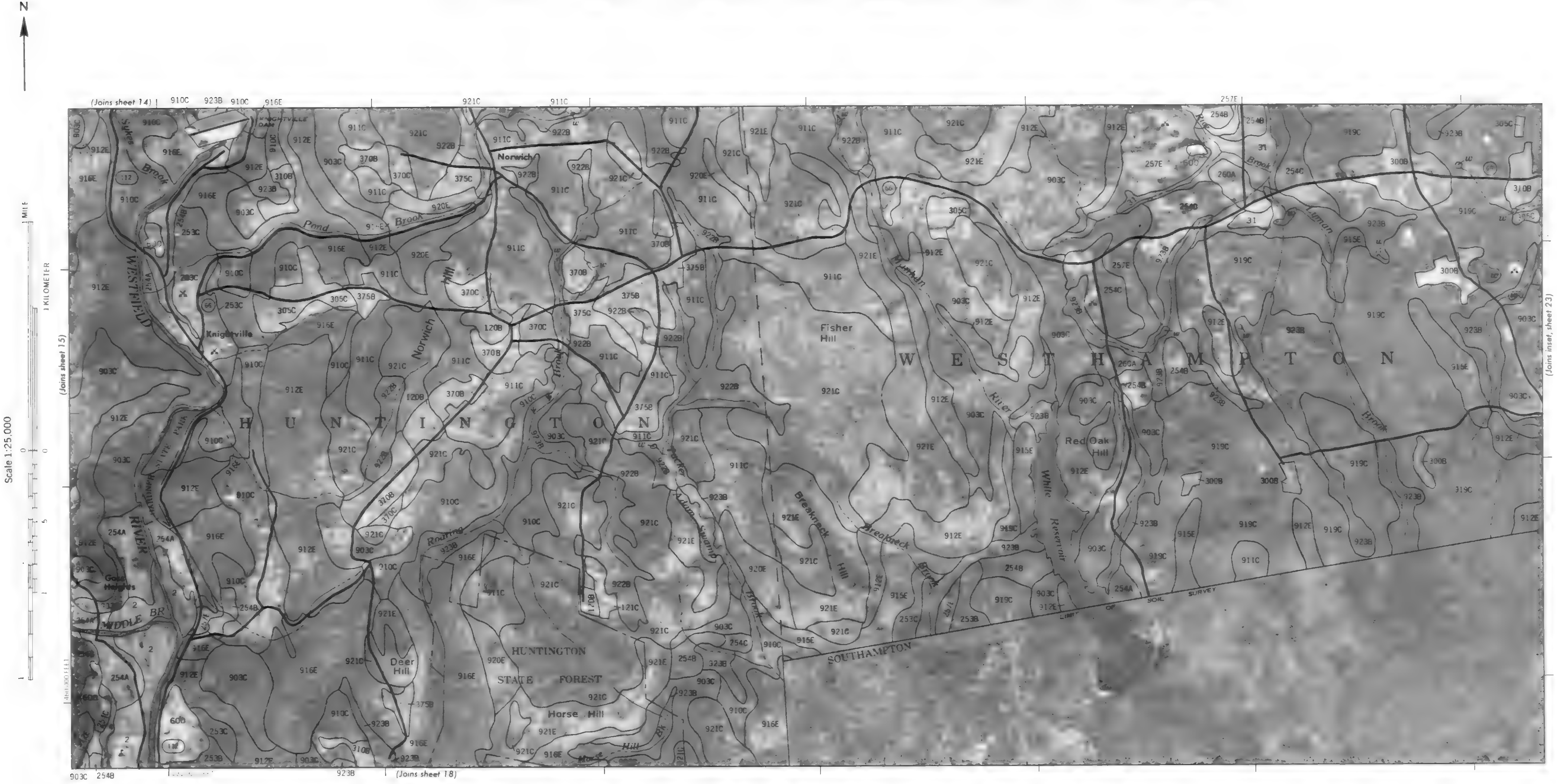

N
(Joins sheet 13)
(Joins sheet 17)
(Joins inset B, sheet 12)
(Joins sheet 16)
195 000 FEET
225 000 FEET
460 000 FEET
Chester
Chester Center
Abbott Hill
Prospect Hill
Cherry Tree Hill
Round Top Hill
Little Mouse Hill
Round Hill Pond
C H E S T E R
LITTLEVILLE LAKE
HUNTINGTON
HAMPDEN COUNTY
HAMPSHIRE COUNTY
Westfield River
Austin Bk
Walker Brook
Blair Brook
Abbott Brook
Mica Brook
Mill Brook
Griffin Brook
Sanderson Bk
DAM
STATE FOREST
Scale 1:25,000
1 MILE
1 KILOMETER

SOIL SURVEY OF HAMPDEN AND HAMPSHIRE COUNTIES, MASSACHUSETTS, WESTERN PART — SHEET NUMBER 16



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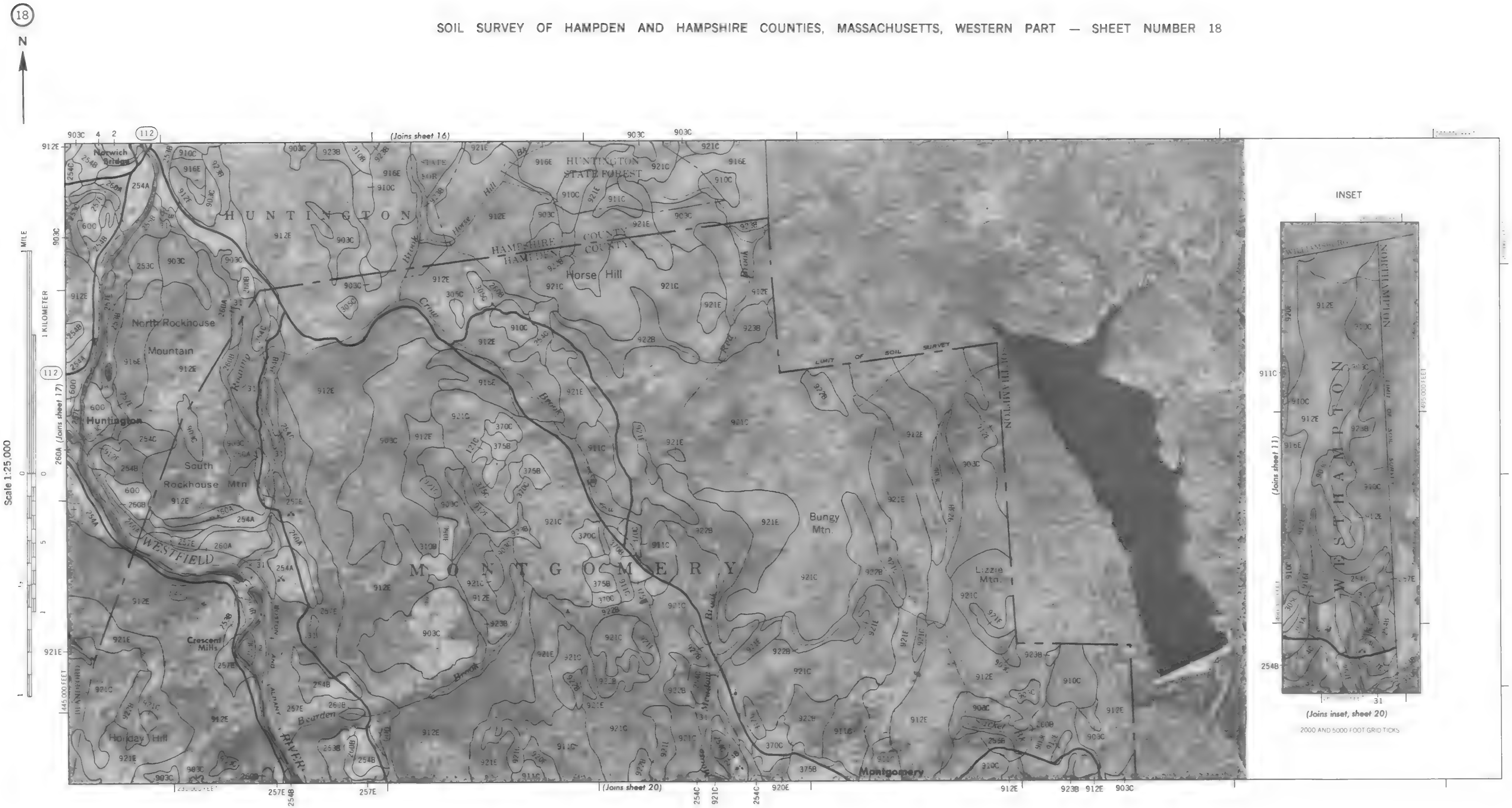

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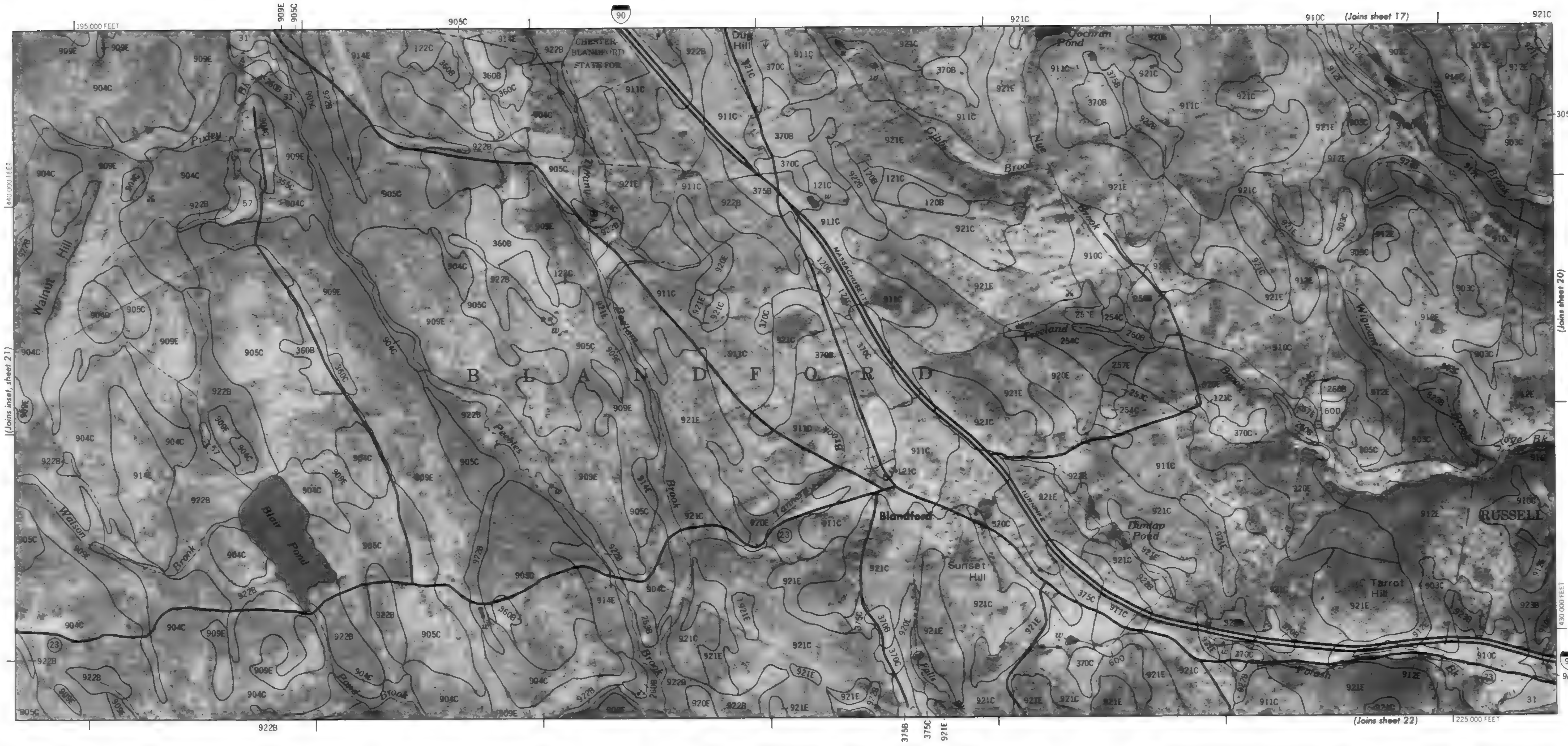
N



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N

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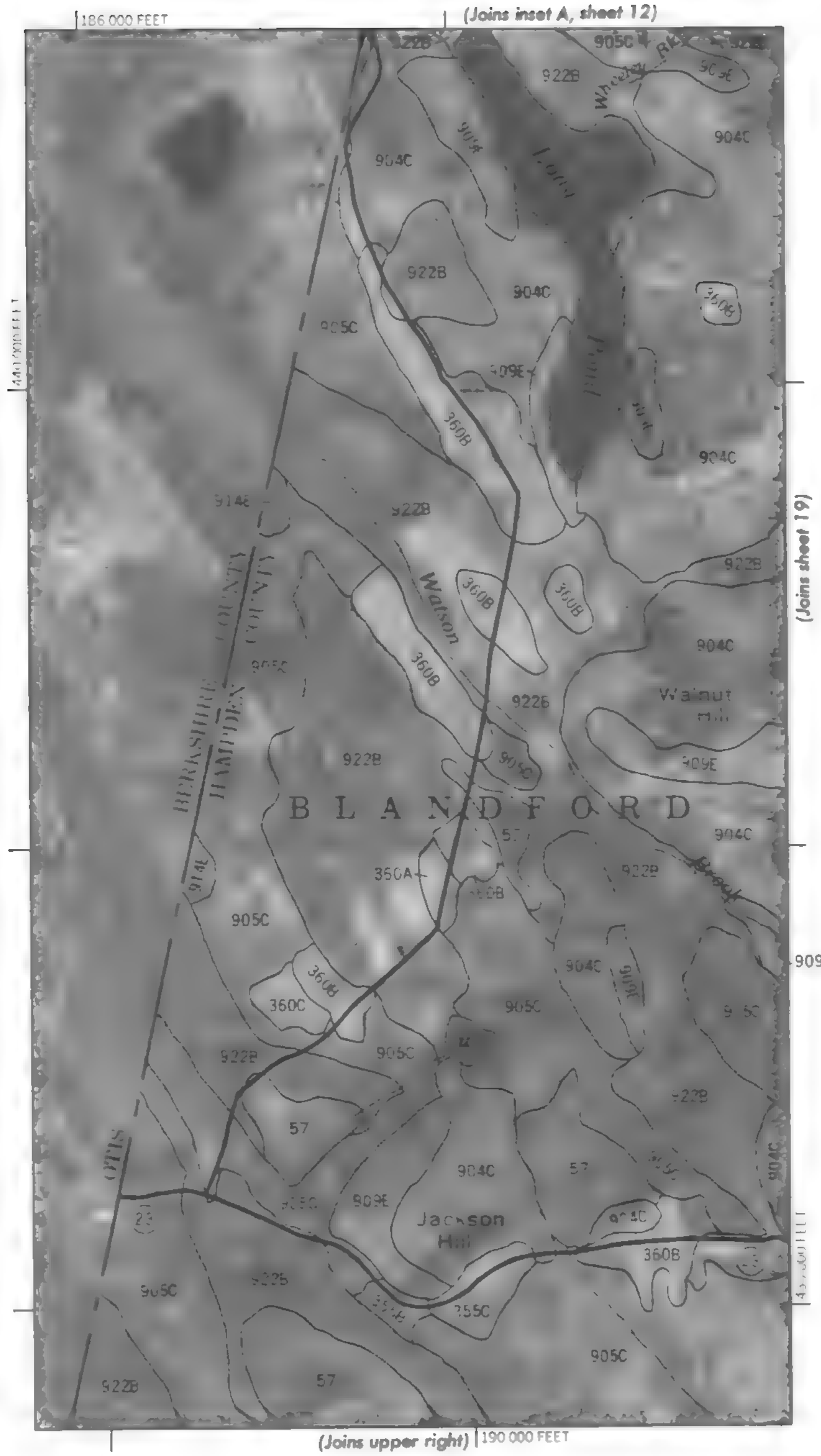
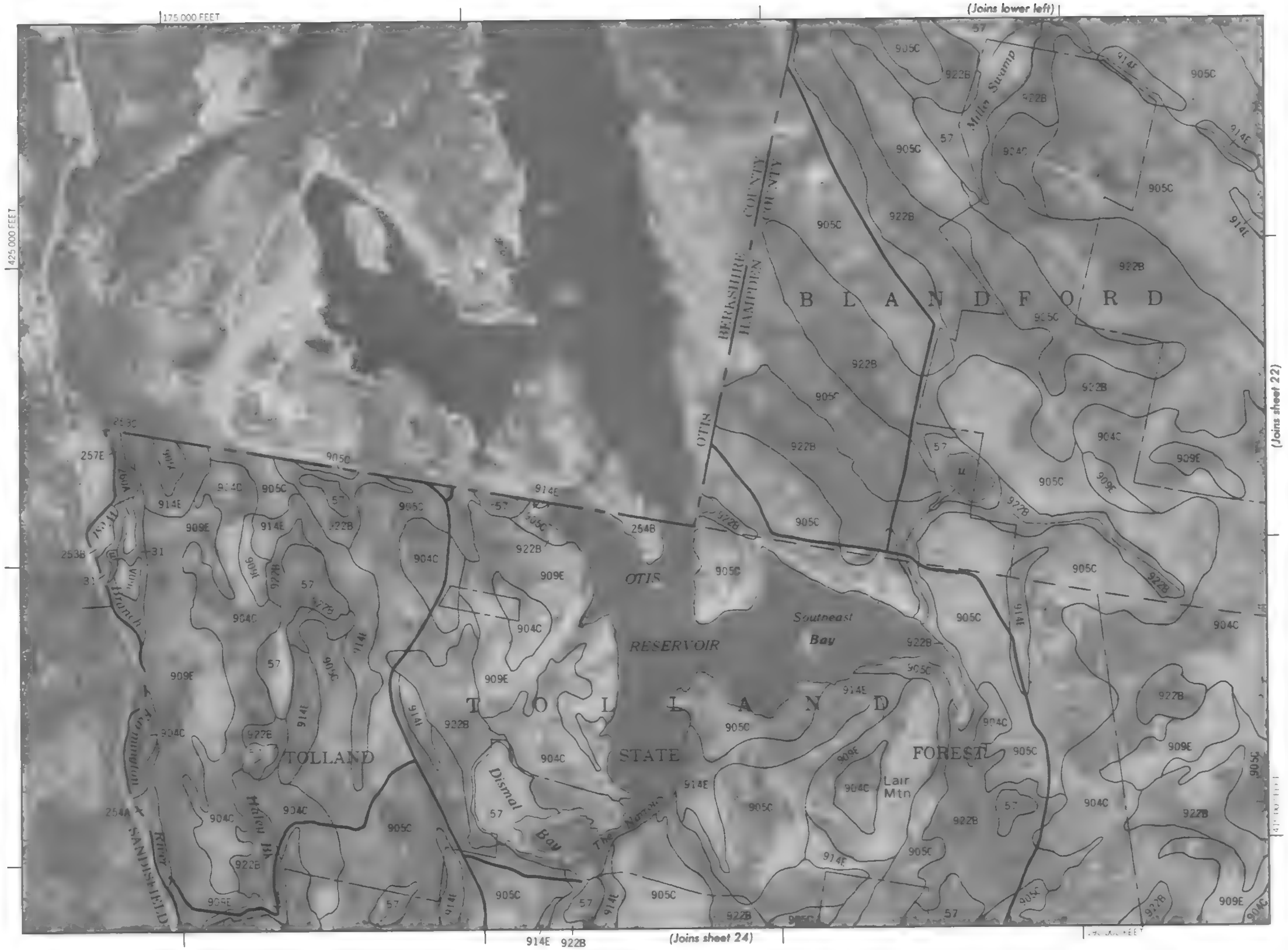
INSET



4000 AND 5000-FOOT GRID TICKS



Scale 1:25,000

1 MILE

1 KILOMETER

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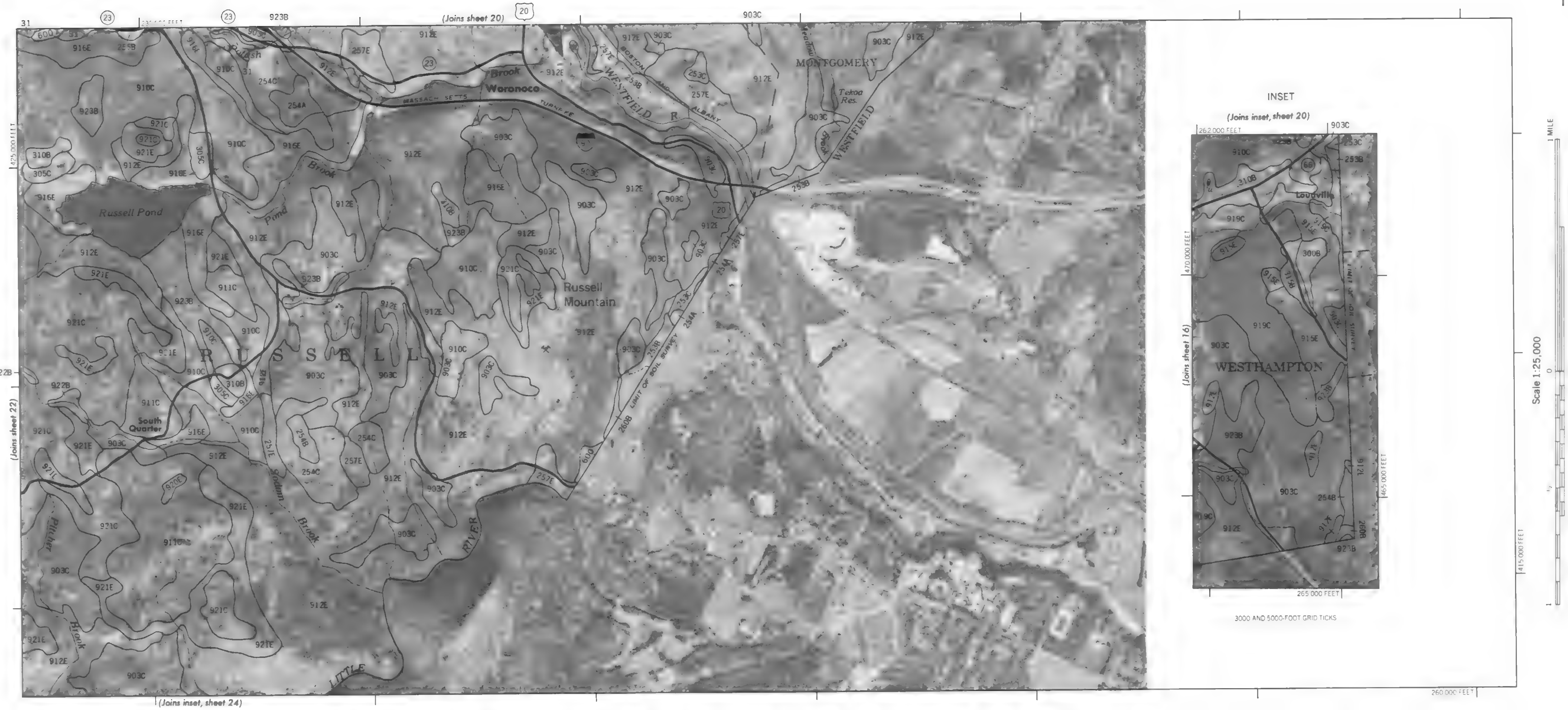

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N

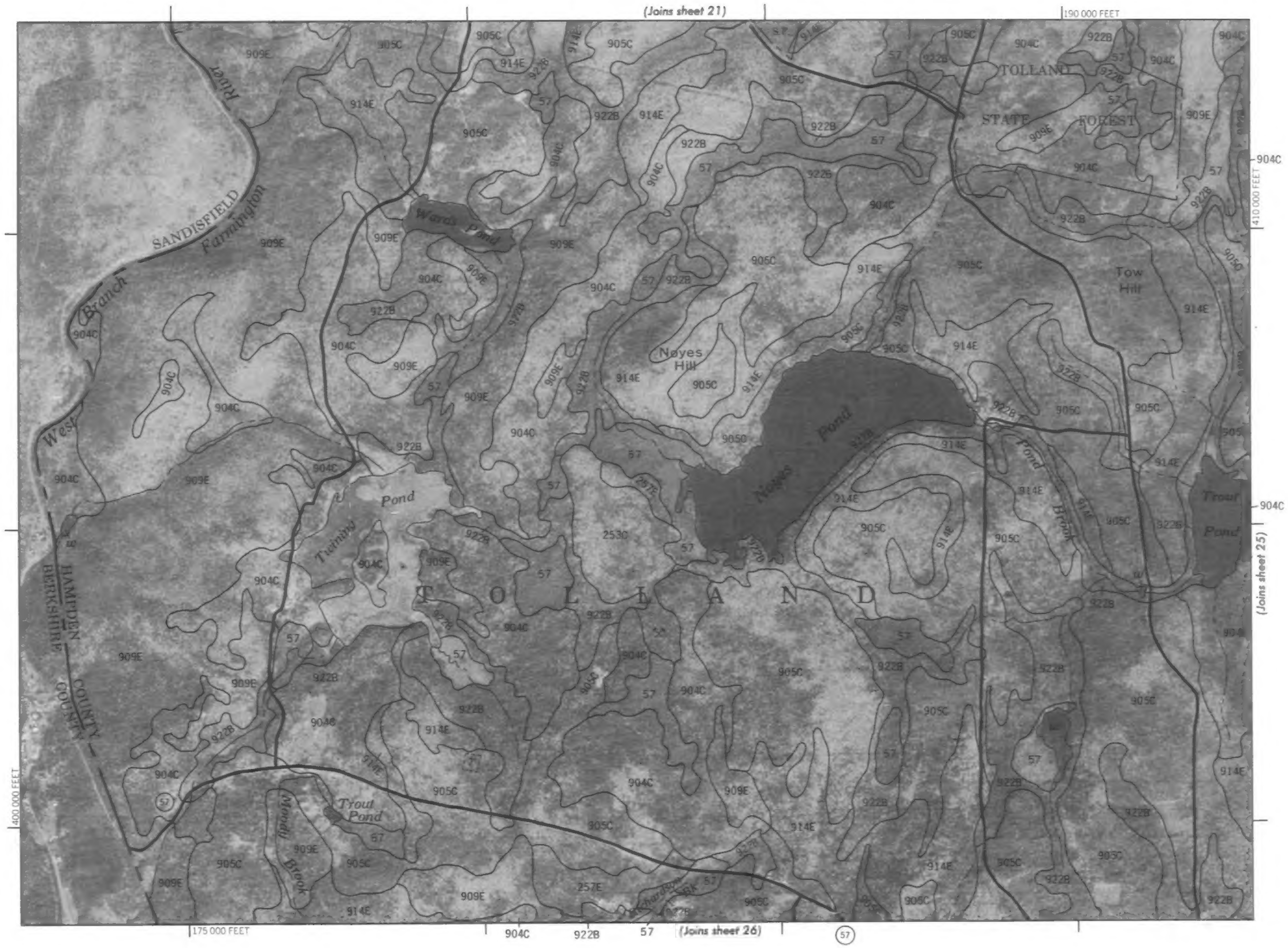
SOIL SURVEY OF HAMPDEN AND HAMPSHIRE COUNTIES, MASSACHUSETTS, WESTERN PART — SHEET NUMBER 24

Scale 1:25,000

1 MILE

1 KILOMETER

INSET



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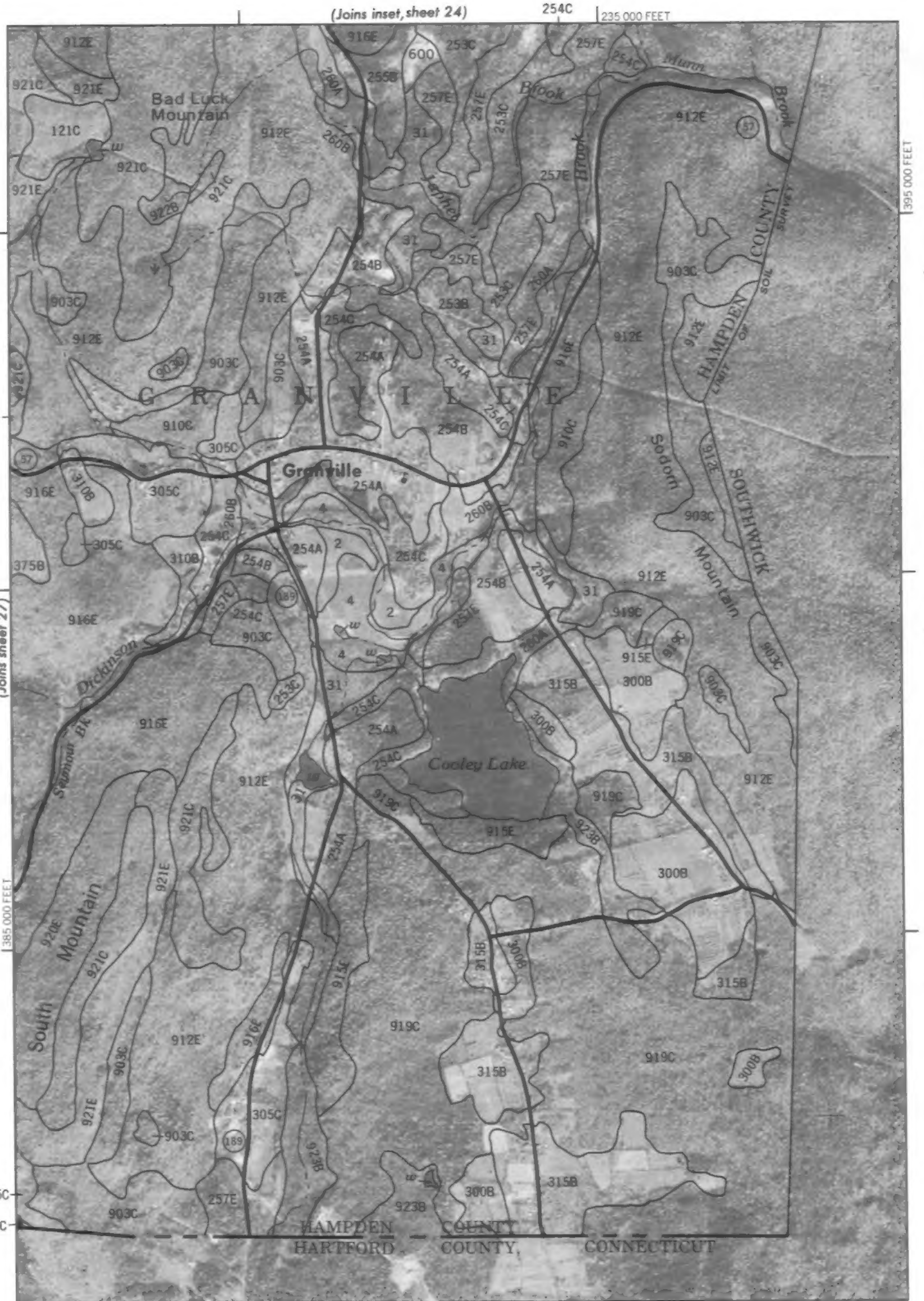
N

Scale 1:25,000

1 MILE

1 KILOMETER

INSET



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27

N

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Scale 1:25,000

1 MILE

1 KILOMETER